

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

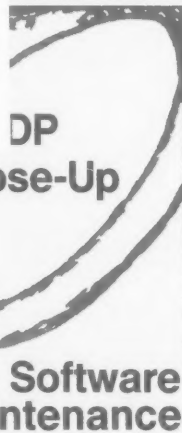
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4/year

February 21, 1983

Vol. XVII, No. 8

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NEWSPAPER

## It Keeps Costing More and More

By Paul Gillin  
CW Staff

DP managers beware. DP expenditures on software maintenance have steadily crept up over the last five years to the point, experts say, where the average shop now devotes about 50% of its total software budget to maintenance. Figures of up to 90% are not uncommon.

DP managers are now wrestling with the dilemma of whether to restructure entirely their applications or to opt for the short-term alternative of patching up bearish programs until time and budget permit a changeover.

Many DP shops have undertaken a variety of programs to contain maintenance costs (stories on Page 8). However, experts warn that managers who ignore the rising costs of maintenance could be faced with an expensive crisis within a few years.

"[DP managers] are aware of the problem, but with the explosion of new technology, they have a lot to

(Continued on Page 8)

## Proposals Narrow Qualifying Projects

# Software R&D Tax Credit Rocky

By Bill Laberis  
CW Staff

A provision of the Economic Recovery Act of 1981 that was expected to give both users and vendors a 25% research tax credit for software development may be in trouble.

Recently published proposals of the Internal Revenue Service appear to limit severely the types of software development — in-house or otherwise — that can qualify for the tax credit. It was widely believed that the research credit would be applied to a broad range of software development projects undertaken by users and vendors [CW, June 28].

The IRS has stressed that the rules are merely proposals and were extracted verbatim from other proposals hashed out in Congress when it

formulated the Economic Recovery Act. Nonetheless, both software users and developers contacted this month made it clear they do not care much for what they have seen and are intent on making their sentiments felt at hearings on the matter next month.

"My biggest objection is that these rules should give us guidance. I read them, and I didn't come away with a whole lot of guidance," said George J. Yost III, a partner at the accounting firm of Coopers & Lybrand in Boston.

"They define the term 'research costs' to exclude any development costs of software where the operational feasibility is not seriously in doubt," Yost said. "The rules go on to say that the programming itself

should involve a significant risk that it cannot be written [to qualify for the tax credit] ... Why would you undertake such a project in the first place? It makes no sense."

According to the proposed IRS rules, "the costs of developing computer software are not research or experimental expenditures" and therefore do not qualify for the credit.

"However," the rules continue, "the term 'research or experimental expenditures' includes the programming costs paid or incurred for new or significantly improved computer software. The term does not include costs paid for the development of software, the operational feasibility of which is not seriously in doubt."

In addition, "the costs of modify-

(Continued on Page 6)

## Honeywell Expands Large-System Line

By Susan Blakeney  
CW Staff

PHOENIX — Honeywell, Inc. recently expanded its large-scale mainframe line by adding two systems and introducing an enhanced version of its top-of-the-line Multics system, the DPS 8/70M. The company also announced:

- Two entry-level models of its large-scale systems running under both the Gcos 8 and CP-6 operating systems.

- An enhanced version of Gcos 8 for the DPS 8 and DPS 88 hardware line (story on Page 7).

- A family of Personal Data Query software tools for information retrieval and report-writing functions (story on Page 7).

- Price cuts ranging from 25% to 50% on a number of its CPUs, memory modules and system upgrades (story on Page 7).

The two additions that Honeywell made to its large-scale DPS 8M processor family earlier this month are the DPS 8/52M and DPS 8/62M. Both run under Multics and reportedly feature a base system to which performance modules can be added.

The DPS 8/52M is field upgrade-

able to a DPS 8/62M, which can be upgraded to the enhanced DPS 8/70M, for which the standard amount of main memory has been increased from 2M to 8M bytes. No reprogramming, operating system changes or regenerations are required for these

(Continued on Page 6)

## Proprietary Language Snags \$3 Million Budget System

By Jeffery Beeler

CW West Coast Bureau

SAN JOSE, Calif. — Major shortcomings continue to plague a \$3 million budgeting and accounting system that a county government here has already spent more than three years trying to install and modify to suit its needs.

The performance of Santa Clara County's three-year-old Comprehensive Budget and Management Information System has proven so unsatisfactory that the county is considering extensively rewriting or possibly even replacing CBMIS' software. Chief among the system's drawbacks is its unexpectedly high cost of operation, now estimated at \$2 million annually, according to the county's fiscal services manager, George Rixman.

Much of the system's high operating cost is attributable to the "inefficiency" of its programming language, Rixman said. Known as the General Financial System, the language is proprietary to American Management Systems, Inc., the Arlington, Va.-based vendor that wrote CBMIS' software from scratch.

"AMS wanted to use its own lan-

guage with the system rather than an industry standard like Cobol so that when changes had to be made in the programs, only the vendor could do the job," Rixman said. After all, he added, "the county just can't go out and hire a GFS programmer off the

(Continued on Page 6)

## Bell-Ansi Feud Stalls Videotex

By Phil Hirsch

CW Washington Bureau

A battle between AT&T and the American National Standards Institute over a pending standard threatens to squelch the emerging U.S. market for videotex systems.

The proposed standard is the North American Presentation Level Protocol Syntax (NAPLPS). AT&T has applied for patents on NAPLPS' underlying technology.

Ansi will not promulgate a standard based on patented technology unless the patent is licensed to the public on reasonable terms. AT&T's unregulated subsidiary, American

(Continued on Page 4)



## No, They're Not Disk Packs

They're stacks of pots for plants that will decorate Security Pacific National Bank's \$100 million information processing center in Brea, Calif., which is set to open on March 15. The bank believes the center represents a departure from the usual computer operations organization. Story on Page 12.

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices. PSN 127-620. Computerworld (ISSN: 0010-8411) is published weekly, except February (5 issues), April (5 issues), May (6 issues), June (5 issues), August (7 issues), September (5 issues), October (7 issues), November (5 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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## Honeywell Ends Inmate Training

By Patricia Keefe  
 CW Staff

WALTHAM, Mass. — Honeywell, Inc. has decided to end an innovative DP inmate training program initiated in Massachusetts prisons 16 years ago.

The DP training program had graduated at least 650 inmates who found employment within the computer industry after they were released from prison, according to Honeywell figures. In addition, the program received national acclaim as a model rehabilitation program, and Honeywell received a presidential award for its efforts.

"We determined that the needs of the program and its overall effects had changed," Honeywell spokeswoman Sandy McLaughlin explained here last week.

### Enthusiasm Waned

Inmate movement throughout the prison system, which jumped about 31% last year over 1981's figures, according to the Massachusetts Department of Correction (DOC), had resulted in a lower percentage of students completing the program, and Honeywell's enthusiasm for the training program waned as a result.

Honeywell also apparently lost interest in the program following a midnight raid last year on a suspected drug and gambling ring that was allegedly being operated out of the Framingham, Mass., State Prison's computer training facility [CW, Jan. 11, 1982].

The purpose of the training program was to teach inmates good business practices and the fundamentals of data processing.

However, after the January 1982 raid on the Framingham facility, in which records from the inmate service bureau, Con'puter Systems Programming, were seized and its operation terminated, the DOC "temporarily suspended the entire DP training program for review purposes," DOC spokeswoman Lorraine Carli said.

DOC gave Honeywell officials the authority to reopen the program, but the company chose not to, she added.

## Charges Dropped

CAMBRIDGE, Mass. — A Middlesex County Superior Court judge has dismissed charges against five former Framingham state prison inmates accused of failing to file state income tax and partnership returns here.

The charges stemmed from a January 1982 drug and gambling raid on the Framingham facility and its inmate-run, profit-making computer service bureau, Con'puter Systems Programming (CSP) [CW, Jan. 11, 1982].

The five inmates were partners in CSP, a spinoff of a DP training program jointly sponsored by the Massachusetts Department of Correction and Honeywell, Inc.

The charges against the five defendants — Susan E. Saxe, Benjamin DeChristoforo, Richard Quillen, Kenneth Chapin and George McGrath — were dismissed Jan. 29 after the Middlesex County District Attorney's office was unable to comply with an order to produce all exculpatory evidence for the defense, according to Middlesex County Assistant District Attorney Carol Ball. Exculpatory evidence is any evidence that has a tendency to clear, justify or excuse a defendant of alleged guilt and is the absolute right of the defense.

According to Ball, the gathering of the exculpatory evidence was "such a colossal bureaucratic and administrative undertaking" that the prosecution was unable to comply with the order.

The DOC has no plans to begin a similar program in the future. "We were sorry to lose the program. It was very worthwhile," Carli said.

Because the program had been suspended after the Framingham raid, it had no enrollees. Honeywell's decision, therefore, did not inconvenience any current students.

However, a spokeswoman for the Northeastern University School of Law's Prisoner Assistance Project, Denise Sudell, said it was "very unfortunate" that the program would be discontinued.

### Chance for Better Life

"It was one of the very few training programs that gave prisoners a meaningful chance to go on to a new and better life on the outside. Its removal cuts down on that chance."

DP training at several Massachusetts prisons began in 1967 at Walpole State Prison with the donation of equipment from Honeywell and, later, from Digital Equipment Corp. Honeywell volunteers guided inmates through a three-phase program lasting approximately nine months, complete with testing at various levels and then presented students with certificates.

Under the program, graduates were required to teach a programming class to other interested inmates. Honeywell conducted all the testing.

Con'puter Systems Programming was developed in 1976 in Framingham after the inmates began making money through various contracts with state agencies.

Today, however, the computer room at Framingham state prison is closed. DP training is no longer available to inmates at that institution or to others at Walpole, Bridgewater and Norfolk.

Honeywell expects to have all of its donated equipment out of the prison system by March, according to Honeywell's McLaughlin.

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# AT&T Holding Tight to Videotex Patent Data

(Continued from Page 1)

Bell, Inc. (the telephone company's chief point of contact with Ansi on NAPLPS) has verbally agreed to comply with Ansi's requirement, but has not said explicitly that the patents will be licensed.

"We must first be sure that no one else has applied for or received a patent on any of the technology included in our application," Dennis J. Sullivan Jr., American Bell's vice-president for consumer information services, explained last week. Without this determination, he said, the company could be sued by another inventor if it began licensing NAPLPS.

Although the U.S. Patent & Trademark Office has been asked to search its files, this will take about

six months. "Maybe a little less, maybe a little more," Sullivan said.

But Ansi cannot wait six months. "Timing is all-important," said Tom Hastings, head of the group that drafted NAPLPS. "Once manufacturers invest in nonstandard circuitry, getting them to agree on a common approach enabling competing systems to talk to each other is extremely difficult."

Ansi plans to adopt NAPLPS as an official U.S. standard by the end of May. The draft is now out for public comment. According to Hastings, if American Bell does not agree to license its technology on nondiscriminatory terms before May 21, when the public comment period ends, competitors are likely to develop al-

ternatives that sidestep American Bell's proprietary technology and are incompatible with each other.

This is expected to dampen enthusiasm for videotex among providers of videotex services. Not only would incompatible terminals cost them more, but whatever system they choose would reach fewer end users.

Hastings insisted that American Bell can meet Ansi's requirements without waiting for the patent search; all the company has to do is specify reasonable terms for the use of its NAPLPS patents once they are granted. Asked whether this would solve the problem, American Bell attorney Richard Evans declined to answer directly and would say only that American Bell plans to respond

officially "within the next few weeks" to Ansi's request for licensing of NAPLPS on reasonable terms.

Evans indicated the statement will affirm American Bell's intention of complying fully with the standards group's request. He added, however, that "until we know whether the patents are going to be issued, we can't license the technology."

Ansi's Hastings made it clear that a statement of intentions would not provide the kind of commitment Ansi needs before May 21.

## Another Version

One version of the controversy swirling around the proposed North American Presentation Level Protocol Syntax (NAPLPS) standard comes from AT&T, which maintains that it cannot comply with the American National Standards Institute's (Ansi) request to license its NAPLPS-based patents on reasonable terms until its patent claims are validated.

But another version is that the telephone company is not disclosing the underlying NAPLPS technology because it wants to prevent its competitors from getting to the market first with better videotex systems.

The latter view is held by Bill Frezza, a member of the Ansi NAPLPS standardization group. Frezza, a former Bell Laboratories employee, is one of the inventors of the NAPLPS technology that AT&T is now trying to patent. He currently heads a team at General Instrument Corp.'s Jerrold Division that is developing an NAPLPS-compatible terminal family.

"AT&T knows that its competitors won't make a significant investment in NAPLPS until they are sure they won't have to pay an arm and a leg for use of the technology," Frezza said in a recent interview. But another, even stronger indication of the phone company's intentions, according to Frezza, is a lawsuit that Bell Labs has filed against General Instrument and two of its employees who formerly worked at the labs.

These employees — Dr. John Gaby and Arthur Mansky — worked on the videotex frame-creation terminal that American Bell, Inc., AT&T's unregulated subsidiary, recently began marketing. Bell has alleged that they are incorporating ideas and information stolen from Bell Labs into General Instrument's upcoming Communicom terminal.

Earlier this month, the judge hearing the case issued a temporary injunction barring Gaby and Mansky from working on the Communicom project until May 1.

According to Frezza, General Instrument had planned to display an engineering prototype of the Communicom terminal at the National Cable Television Association's annual convention next June in Houston (commercial models are scheduled to be available "by the summer of 1984"). With the injunction on Gaby and Mansky, however, Frezza is uncertain if the prototype can be built in time.

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# Would Add Manufacturing Capacity

## IBM, Matsushita Talking About Joint Venture

By Bill Laberis  
CW Staff

ARMONK, N.Y. — In a move that observers say may have been spurred by a need for greater manufacturing capacity, IBM announced last week that it will hold "detailed discussions" with Matsushita Electric Industrial Co. of Japan to establish a joint manufacturing venture. The venture's mission, IBM said, will be to develop low-cost, high-volume computer terminals, office automation equipment and small business systems.

IBM currently buys parts from other U.S. and Japanese vendors for many of its products, but it does not have a significant vendor-to-vendor relationship under which another company makes and supplies finished products bearing the IBM label.

With annual sales of \$10.6 billion last year, Matsushita is the world's largest consumer electronics company. It operates under such trade names as Panasonic, Quasar and Technics.

### Mid-'83 Announcement?

Discussions with Matsushita began several months ago, an IBM spokesman said, but he declined to speculate on how soon the talks would be completed and the joint venture launched. One analyst predicted the venture's first products could be announced as early as mid-1983, although no one contacted ventured a guess as to where the products would be marketed.

Some industry analysts, however, said the talks are intimately linked to an impending announcement of the IBM Personal Computer in Japan. The model to be introduced, perhaps as early as next month, will be de-

signed specifically for the Japanese market, unlike the version marketed in the U.S., Europe and Australia, one observer said.

"IBM has been interested in finding a Japanese partner for a long time," said Clive Smith, an analyst with the Yankee Group in Boston. Matsushita is a sound choice for IBM, he added, because it is not a direct competitor for most of IBM's products and because it has demonstrated an ability to manufacture low-cost, high-volume electronics products of top quality.

Matsushita also brings a highly developed international marketing network to the bargaining table,

Smith pointed out.

Both Smith and Jack Hart, an analyst with International Data Corp. of Framingham, Mass., said IBM Japan Ltd., the company's Far East subsidiary, may not have the manufacturing capacity to supply a potentially fertile Japanese market for the Personal Computer and other low-end computer products.

### Focusing on 4300s, 3080s

"IBM Japan will probably continue focusing on the 4300 series and the [3080 series] and leave the smaller stuff to a local manufacturer," Hart said. "Maybe IBM came to the conclusion that the Japanese just do

this better than anyone else, including IBM. This is not to say that IBM products made in Japan by Matsushita won't find their way into other markets, like the U.S."

Hart said IBM would profit by having a greater manufacturing presence in Japan, especially with a company as large and well-known as Matsushita.

Citing a distribution pact IBM signed recently with Japanese retail giant Kanematsu-Gosho and the formation in December of a Japanese-IBM computer leasing company, Hart said, "This is starting to sound like a deliberate, overall IBM strategy in Japan."

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## Users Groups — Good, Bad Or Indifferent?

Are you happy with your user group, or is it more a social club than a forum for the exchange of professional experiences?

In an upcoming series, *Computerworld* will examine the role that user groups play in the data processing community. We are interested in hearing from members of both hardware and software user groups.

In responding, interested parties are asked to specify whether the group is member funded or vendor funded, whether it is staffed by any full-time personnel, how often it meets and if it produces a newsletter of any kind. Respondents should also include their telephone numbers.

Please address all comments and observations about your experiences with user groups to Susan Blakeney, *Computerworld* Editorial Department, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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# Honeywell Expands Large-System Family

(Continued from Page 1)  
upgrades, Honeywell claimed.

All three models support a range of concurrent processing activities, including batch processing, remote job entry, on-line data base inquiry and update and interactive end-user languages, applications and services, according to the vendor.

## Basic DPS 8M Central System

A basic DPS 8M central system includes a CPU, a system control unit with 8M bytes of memory, and an I/O multiplexer with 36 channel function slots, which can be expanded to 54. Memory on the DPS 8/52M and 8/62M can be expanded to 32M bytes, and the DPS 8/70M can accommodate up to 64M bytes.

Prices for these systems start at \$450,000, \$725,000 and \$950,000, respectively. Additional memory on all three DPS 8M models is available for \$25,000 per 1M byte.

Deliveries for the systems are slated for the fourth quarter of this year, according to the vendor.

## Entry-Level Systems

The low-end DPS 8 systems introduced by Honeywell to run either in the Gcos 8 or CP-6 operating environments are the DPS 8/47 and 8/49, designed with the same architecture as the existing DPS 8/20 and 8/44 systems, but reportedly utilizing faster circuitry for better performance.

The DPS 8/47, for example, offers approximately 18% more processing

power than the DPS 8/44, while the DPS 8/49 reportedly delivers 72% more power than the DPS/44.

These models can be ordered in full-tandem configurations, and the DPS 8/49 can grow to a maximum of four processor configurations, the vendor reported. They are oriented toward distributed processing and communications network management, capable of serving as satellite systems at high-work-load, high-growth locations, according to a spokesman.

The base system includes a CPU, a system control unit and an I/O multiplexer. It is configured with 2M bytes of main memory. All systems

can be expanded with additional memory and CPUs, the vendor noted.

The models for the CP-6 environment, the DPS 8/47C and 8/49C, come with 12M bytes and 16M bytes, respectively. The CP-6-based systems also come with a Datanet 8C front-end network processor. The DPS 8/47C costs \$228,000 and the 8/49C is priced at \$350,000.

Pricing for the Gcos 8-based system is \$153,000 for the DPS 8/47 and \$235,000 for the DPS 8/49.

Additional memory for all systems costs \$10,000 per 1M byte. These systems will reportedly be available at the end of this quarter.

Honeywell also added a power enhancement to the existing DPS 8/44 processor and enhanced its Datanet 8 front-end network processor. Costing \$70,000, the processor power enhancement supporting either Gcos-8 and CP-6 can boost performance by 72%, Honeywell claimed.

The Datanet 8 power enhancement increases processing power of a base Datanet 8 by adding a slave processor module and associated cache memory to existing cabinetry. Priced separately, this option is \$18,500.

Further details on all products are available from Honeywell, through P.O. Box 8000/T-60, Phoenix, Ariz. 85066.

# Proprietary Language Snags Calif. System

(Continued from Page 1)

street because there simply aren't any available. Nobody wants to learn GFS because it doesn't give you a career path."

For the county, therefore, the selection of GFS as CBMIS' main programming language has distinct disadvantages. Why, then, did the local government officials allow their accounting and budgeting system to be written and implemented in GFS in the first place?

"We've been asking ourselves that same question for three years now," Rixman said with a chuckle. "When we first got the system and began using it, AMS told us that GFS' run-times for specific tasks would be

about the same as Cobol's, but we soon discovered that the system was taking us almost 20 hours to run one day's activities.

"In other words, we nearly needed more time to run one day's work than there are hours in a day. We were continually falling behind."

Asked for his reaction to the county's recent CBMIS-related complaints, AMS Vice-President Jan Lodal voiced surprise. "I haven't heard anything from the county for several years," Lodal said. "They haven't called us and told us they have any problems, which I think is informative. If they have serious problems, you'd think they'd let us know."

Lodal expressed little concern that the county is apparently thinking about either rewriting or replacing its three-year-old CBMIS software. "In the normal course of systems development, it would be about time for the county to start designing a new system," he observed.

Another of CBMIS' major purported shortcomings is that the management reports it produces are typically ill formatted, overly complicated and just downright useless, Rixman said. "We receive a voluminous number of reports from the system, but

most of them I simply throw away," said Maya Bernardo, a senior analyst with the county's Revenue and Systems Agency. "Only two or three of the reports that cross my desk contain just the right level of detail for someone in a position like mine," Bernardo said.

"Under the system we had previously, I could get a necessary report on my desk on the Monday immediately following the end of an accounting period," Bernardo recalled. "Now I frequently have to wait three weeks before I can receive the same report. That sort of thing drives me insane."

To remedy some of its current computing ills, the county has already rewritten a few CBMIS report generators, but those software tools account for only a "very small portion" of the overall system, Rixman said.

The rest of the system would probably prove extremely difficult if not impossible to rewrite because "our existing programs and editors are quite complex, and we don't have programmers who are familiar enough with GFS to dissect our software and transfer the code to Cobol," Rixman said.

# Software Tax Credit Rocky

(Continued from Page 1)

ing previously developed computer software programs, such as the costs of adapting an existing program to specific customer needs or translating an existing program for use with other equipment, do not constitute research or development expenditures."

The consensus among those interviewed on the matter is that the rules are both too exclusive and not specific enough to allow a software developer to know whether a programming project qualifies for the tax credit.

William R. Synnott, senior vice-president of information systems at the First National Bank of Boston, asked his Corporate Finance Department for guidance, but the department "isn't really sure what to make of this. I guess that, in the absence of clearly defined rules, we'll probably make our own judgment and then let them [IRS] challenge it. I had assumed that all new development software qualified for the credit."

Another DP manager said his department "is all tangled up in these rules and regulations." He is "initially inclined to take the credits and then let the government fight it out with us later."

According to Coopers & Lybrand's Yost, fighting it out would mean wading through the tax appeals process and, perhaps, letting the matter be ultimately decided by a judge. But, he added, "the rules as they are now are so vague they don't provide a definite enough standard for either

party to make a reasoned determination."

Some software companies represented by the Association of Data Processing Service Organizations, Inc. (Adapso) are reviewing the rules and are preparing to respond to the IRS through Adapso. John Imlay Jr., chairman of Management Science America, Inc. and a member of Adapso, said several software companies have telephoned Adapso to advocate a group response.

"It sounds to me like the IRS has singled out software for some reason," Imlay said. "There's a significant groundswell developing" within Adapso to confront the IRS.

## Comments?

WASHINGTON, D.C. — The Internal Revenue Service said it is anxious to receive feedback from users and vendors interested in the rules on the federal investment tax credit pertaining to software development.

Any individual, company or organization wishing either to comment on the IRS' proposed rules or to offer revisions of them should do so in writing. Those wishing to speak at hearings on the matter, which will be held sometime in late March, should submit a brief outline of his oral comments for IRS review.

All inquiries and submissions should be sent to the Internal Revenue Service, Attn. CC-LRT (LR-236-81), 1111 Constitution Ave. N.W., Washington, D.C. 20224.

# Data General Reduces Prices On Eclipse MV/8000 Superminis

WESTBORO, Mass. — Effective immediately, Data General Corp. has cut prices by 7% to 18% on its top-of-the-line 32-bit Eclipse MV/8000 series of superminicomputers.

For example, the DG 9840-B 2M-byte MV/8000 system with a 190M-byte disk, a tape unit, 16 asynchronous communications lines, a system console, DG's AOS/VS operating system and 15 DG software credits now sells for \$190,400, down from \$222,700, a spokeswoman said.

The Eclipse MV/8000 systems are available with up to 12M bytes of main memory and over 9.6G bytes of on-line storage, DG said. Initial packages include 1M-, 2M- or 3M-byte memory; a magnetic tape unit; a choice of disk subsystems; an 8- or 16-line intelligent asynchronous controller; a system console; credits toward the purchase of DG software; and either AOS/VS for time-sharing, multiple batch and on-line applications or AOS/Real Time 32, for dedi-

cated real-time processing.

Further details on the price cuts can be obtained from the vendor at 4400 Computer Drive, Westboro, Mass. 01581.

## Software Directory Out for IBM Micros

FRAMINGHAM, Mass. — "The IBM Personal Computer Software Directory" has been announced here by International Management Services, Inc.

This publication will reportedly reference all types of software for the IBM Personal Computer and its growing number of software-compatible systems.

The directory is slated for release the second quarter of this year and will be updated on a quarterly basis, according to the publisher.

It will be priced at under \$35, the publisher said from Two Frederick St., Framingham, Mass. 01701.

## Communications Facilities Update Honeywell's Gcos 8

By Susan Blakeney

CW Staff

PHOENIX — In conjunction with the expansion of its mainframe line (story on Page 1), Honeywell, Inc. updated its Gcos 8 operating system software with a series of communications-oriented multiprogramming and multiprocessing facilities.

Dubbed the SR 2300 product family, the series is compatible with eight of the firm's DPS 8 computers and two of its top-of-the-line DPS 88 very large-scale systems. It is primarily aimed at improving the computer's organizational efficiency, solving program backlog problems and increasing migration support for users of Honeywell's Gcos III operating system software, a spokesman said.

Major features of the SR 2300 software include:

- Personal Data Query (PDQ) end-user facilities.
- Software Disk Cache Buffer.
- Console Manager Facilities.
- Common Files Facility.

The PDQ Relational Access Manager facility allows end users to access production data bases without requiring data extraction from the DP department, the vendor explained. Specifically, Honeywell's Codasyl-compliant Data Management-IV and Integrated Data Store/II structured data bases, as well as its Unified File Access System files, can be accessed by the Relational Access Manager, a spokesman said.

The four products that comprise the PDQ family are the Example Query, the Interactive Query, a Comprehensive Report Examination and Display Option and the Cobol-74 Relational Query. These modules can be leased separately for from \$90/mo to \$350/mo, the vendor said.

The vendor's Gcos 8 Software Disk Cache Buffer is designed to boost system performance by reducing the number of physical I/O data transfers to and from disk storage. It accomplishes this by setting aside a site-controllable portion of main memory as a cache buffer to store frequently used data, allowing access at main memory speed.

This product is offered at a monthly license fee of \$570 on DPS 8/20 through 8/49 systems; \$1,045/mo on DPS 8/50 through 8/70 systems; and \$2,000/mo for the DPS 88 model.

The Console Manager Facilities allow a "master" console to be given full control over all other consoles on a system, according to the vendor. This master can reportedly manage configuration, security, access and traffic control, with more than 120 commands.

An option for expanded support of remote operator consoles connected via a Datatnet 8 front-end network processor utilizes Honeywell's Distributed Systems Architecture protocol. Also, the console journalization option reportedly allows configuration of some system consoles without a hard-copy requirement.

Licensing for the Console Manager is \$200/mo, with the remote console option priced at \$95/mo; and the console journalization option at \$140/mo, the vendor said.

The Common Files Facility report-

edly allows up to four systems to share a common file system and operate cooperatively as a cluster. This sharing of mass storage increases total capacity, improves availability and provides load leveling for the Gcos and Gcos 8 operating systems on DPS 8 and DPS 88 large-scale machines, Honeywell said.

This software is incorporated into the Gcos operating system software and is not priced separately, the vendor said.

These software offerings will be available in the fourth quarter of 1983. The vendor can be reached through P.O. Box 8000/T-60, Phoenix, Ariz. 85066.

## DPS 8/70, DPS 8/70C Reduced; Cost of Adding CPUs Down

PHOENIX — Honeywell, Inc. has slashed by 25% the price of its DPS 8/70 mainframe, which runs under Gcos and Gcos 8, dropping the system's price from \$1.2 million to \$900,000. The same model running CP-6, the DPS 8/70C, has been repriced from \$1.3 million to \$1 million.

The cost of adding a CPU to either of these systems has been reduced by more than 26%, from \$892,000 to \$655,000, and additional CPUs for the DPS 8/62 and 8/62C are now down to \$500,000 from \$580,000, according to a Honeywell spokesman.

The cost of upgrading from a

DPS 8/52 or 8/52C to a DPS 8/62 or 8/62C has been reduced by one-third, from \$240,000 to \$160,000. The cost of upgrading the DPS 8/62 or 8/62C to DPS 8/70 models has been cut by more than half, from \$511,000 to \$220,000.

Honeywell also lowered the price tags on memory modules for the DPS 8/20, 8/20C, 8/44 and 8/44C by 42%. Each additional 1M byte of memory has been reduced from \$17,250 to \$10,000, the spokesman said.

Memory on the DPS 8/50 through 8/70 models has been reduced from \$35,000 to \$25,000 per 1M byte.

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# Software Maintenance Costs Swell

(Continued from Page 1)

think about," said Girish Parikh, president of Shetal Enterprises in Chicago. "Some are diverting their attention to new technologies, but sooner or later they will have to face the problem. It won't go away."

High maintenance costs are a relatively new phenomenon, and "we in DP still haven't learned to manage the maintenance function," said Larry Singer, author of *The Data Processing Manager's Survival Manual*.

Experts differ on what constitutes excessive maintenance. One estimated that maintenance should consume no more than 40% of the total software budget. Another advised managers to look at costs on a system-by-system basis. When maintenance consumes an additional two-thirds of an operating budget for a single system, it is time to worry, he said.

The syndrome is most pronounced with software that is more than 10 years old. Code written in the early days of DP was often not well documented and subsequent "quick fix" modifications have added to the mess. "How can you recommend that shops systematically upgrade their documentation in an environment that emphasizes speed over detail?" Parikh asked.

The high turnover that bedevils many DP shops has also hastened deterioration. A package modified by several programmers tends to degenerate into patches and poorly documented modifications, which only

gets more confusing with age.

"If programs are unstructured, as most are, and changes are made, that causes more problems because programmers are unsure of the structure," Parikh said.

Experts say maintenance is also accorded low status in the programmer pecking order, making it appear a noxious job that programmers try to dispatch as quickly as possible. "The people who do maintenance tend to feel like the black gang in the engine room of a ship," said David Robinson, a vice-president at Index Systems, Inc. in Cambridge, Mass.

Since maintenance smacks of run-

ning hard just to stay in the same place, DPs have tended to downplay its cost, even to the point of burying software updates under the heading of enhancements. Authorities who were interviewed, however, agree with Robinson's definition of maintenance as "all the work you have to do to keep the software alive."

While managers have come to accept high maintenance costs as a reality in recent years, many still do not attempt to control costs. "They seem to feel that God has meant them to spend all their time doing maintenance work," Singer said.

## Experts Detail Methods To Control Maintenance Costs

As software ages, maintenance costs rise. But there are measures almost any shop can take to help bring costs under control, according to authorities interviewed by *Computerworld*.

The first step is often to improve documentation. "Sometimes programmers are reinventing the wheel" by documenting software long after it has been written, Girish Parikh, president of Shetal Enterprises in Chicago, said. "While a program is being modified, it can be documented at the same time."

Another approach is the "release

concept" advocated by Index Systems, Inc. of Cambridge, Mass. The method follows the tack taken by software companies that periodically gather patches and enhancements together and offer them as a new release.

"Hold off until you have a large backlog of fixes and then do them all at once," Index Systems Vice-President David Robinson said.

Parikh advocated the logical construction of programs approach proposed by maintenance expert and author Jean Dominique Warnier and published by Ken Orr and Associates, Inc. of Topeka, Kan. He also supported the functional approach promoted by Edward Yourdon of Yourdon, Inc. of New York.

An essential step is to bring maintenance out of the shadows and grant it a position of respect within the DP shop, Singer said.

Despite all good-faith efforts, some programs are too tangled to be easily maintained, according to Herb Cabral, an account manager for the Information Systems Planning Service at International Data Corp. (IDC) in Framingham, Mass. "In that situation, you're probably better to start off from scratch," he said.

Index Systems Vice-President Gary Gulden noted that using high-level languages as a data base tool and for fixing up old software "provides a degree of flexibility the old data bases don't have." However, Gulden advised businesses to be careful in choosing the right language.

"If you have a high-volume business, you want a language that has strength in data management, with backup and security," he said. "If you're a lower volume business, you want better reporting and data extraction. Most products out there do one or the other well, but not both."

Some consultants pointed to application generators, which write their own documentation, as solutions to some maintenance problems. However, IDC Account Manager Jack Armstrong warned that users should beware of what is still a fledgling technology.

"I've got some questions that quick solutions only really cut down the development time," Armstrong said. "They still generate a lot of code and poor documentation."

## Users Fighting To Contain Costs

Yes, there's a problem and yes, we're trying to do something about it.

That was the consensus of opinion of four DP managers recently interviewed by *Computerworld* about the rising costs of software maintenance. Three have undertaken programs to contain maintenance costs over the last three years and the fourth indicated that future software acquisitions will be structured for greater maintainability.

A complete redesign of hardware and software has brought maintenance costs down from 95% of the software budget to 10% in two years at Flexi-Van Corp. in Secaucus, N.J., according to John Shields, vice-president of management information systems (MIS). Shields said the old software was developed in-house and was poorly documented. "We had the whole gamut of problems: rapid turnover, lousy support, poor documentation, you name it."

The company has now gone entirely to packaged applications. "It was purely a business decision," Shields noted. Under the old system, "we couldn't grow in the direction we wanted to grow," he said.

Global Marine, Inc. in Houston began streamlining operations about a year ago and has reduced maintenance from 70% to about 60% of its software budget. Corporate MIS Director Dick Hudson said the department was caught in a routine of making quick fixes and was sometimes having trouble just locating problems in the old software.

The department has "cleaned up some dirty job control language and upgraded the quality of the staff," as well as buying a lot of application packages. Hudson said it is unlikely DP will reduce maintenance percentages any further but noted that the department will continue to evaluate applications carefully before buying. "There are a lot of users out there who are willing to tell you when something is wrong with their package," he observed.

The DP department at A.B. Dick Co. in Chicago now spends about 50% of its software budget on maintenance, down from 80% three years ago. "We had a labyrinthian system that required lots and lots of documentation and people to work on it," recalled Phil Fellows, director of management systems. "Now, whenever possible, we buy a package. When we develop in-house we try to use the same routines all the way through. We're now running five times as much work with 30 fewer people."

Maintenance costs are "an ongoing concern" at Sperry & Hutchinson Co. in New York, according to Allan Vesley, vice-president of MIS. The costs now constitute about 80% of the software budget.

Vesley said changing user requirements have caused software to be modified continuously for many years. And for each year there are more programs to be maintained. He said the company is not working retroactively on maintenance, "but new applications will be designed in a more open-ended fashion with greater capacity for change."

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# Users Waiting for De Facto Standards Communications Tools Still on Hold: Survey

By Jim Bartimo  
CW Staff

Communications products like voice store-and-forward systems and local-area networks may make big splashes at trade shows, but many businesses are still waiting to purchase such products, according to an informal survey of data communications and telecommunications managers.

Only two of the nine managers recently contacted by *Computerworld* had actually implemented a local-area network; two more are planning to buy one eventually.

"Local-area networks are like the 'office of the future.' What's the defini-

tion of it?" was the rhetorical question from the New York director of communications services in a company that manufactures personal care products.

## De Facto Standards?

Other data and telecommunications managers said they are waiting for a de facto local-area networking standard to emerge, while others maintained no amount of waiting would see such a standard emerge.

"I'm implementing a network right now," reported Richard Bisordi, telecommunications manager for Chesebrough-Ponds, Inc. in Greenwich, Conn. "I'm not waiting

for anyone — you have to plan now."

A more recently introduced technology, voice store-and-forward systems, is faring even worse among the respondents. Only two are studying the products and none have yet implemented one.

"We looked at it and had a trial project going with one vendor," said a communications manager of a large Florida-based chain of drug stores.

"The idea is great, but the price has got to come down," he said.

Perhaps the most widely used of the advanced communications technology products is the private branch exchange (PBX).

Nearly all respondents have implemented a PBX and six are planning or investigating the use of the device for the transmission of data as well as voice.

"We hope to enhance our capability for data," the Florida manager said. "We've been promised data rates of 9,600 bit/sec."

Another communications manager is using his PBX "as a dial backup to our data lines and for cost-effective routing. We had a tough time doing this because the telephone company said it was impossible."

## Not Yet Implemented

While some vendors portray the PBX as the solution for office automation, local-area networking and building management, none of the data and telecommunications managers surveyed have implemented such advanced applications, although a small percent hope to do so in the next few years.

Another technology yet to come into its own is videoconferencing, according to the poll's results. None of the telecommunications managers interviewed has yet implemented a videoconferencing system, although five of the nine expressed interest in the idea. Price was noted to be the overwhelmingly limiting factor.

"Senior management likes video conferencing," the New York manager said, "but I know they're not willing to pay for it."

"We're keeping our eye on video, but the price has to come down," he continued.

However, two communications managers have implemented audio teleconferencing systems.

"We have audio and graphics," said the manager of an Alabama paper company.

"The driving force behind it is to have people in on discussions that would not have otherwise been in on them. You can't sell it by saying it will reduce travel, because 90% of the people like travel," he said.

While the presence of microcomputers was reported to be steadily rising, only one manager allows the micros to tap directly into the corporate data base and, even then, through hardware instead of the highly touted micro-to-mainframe software that is coming out.

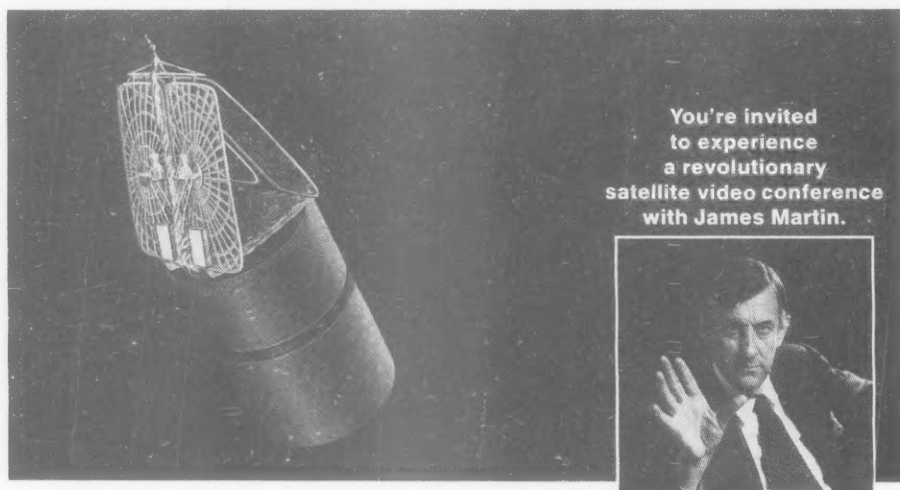
However, respondents expressed interest in this type of communications software and are either testing it or planning to implement it at some point in the future.

## Network Explosion

"I see an explosion in networking when you get micro-to-mainframe interfaces," said a communications manager for a San Francisco clothing manufacturer, "but the ones out now aren't very good."

If so few businesses are using state-of-the-art technology, why then is it so talked about?

"A lot of companies go out and get technology for technology's sake without considering the real business issues," the New York manager said. "Then they go and talk about it at conferences, but it usually never gets taken off the shelf."



## Announcing the first DELTAK Satellite Video Conference exploring "THE INFORMATION CENTER REVOLUTION"

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Detroit	Hotel Pontchartrain	3 pm
Houston	Marriott Astrodome	2 pm
Los Angeles	Hyatt Airport	12 noon
Morristown, NJ	Governor Morris	3 pm
New York	Essex House	3 pm
Minneapolis	Marriott Hotel—Bloomington	2 pm
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# First Link Complete in AT&T Fiber-Optic Net

By Bruce Hoard  
CW Staff

NEW YORK — AT&T earlier this month began service over a 372-mile leg of what it said will be "the world's largest laser-powered telecommunications system" by sending data, color graphics and video communications between New York and Washington, D.C.

The 372-mile fiber-optic network is the first link in a 776-mile project that by 1984 will connect the Boston, New York, Philadelphia, Washington and Richmond, Va., metropolitan areas.

The result of a combined effort by AT&T's Long Lines Division and six Bell operating companies, it will eventually connect 23 high-capacity, all-electronic switches, a spokesman said.

Overall, the entire system can carry 40,000 to 80,000 simultaneous telephone calls along various sections of the route, according to the Bell spokesman. It transmits light pulses

as opposed to electrical signals. Technological improvements are expected to triple its capacity in the near future.

## Capacity Figures

A pair of the hair-thin glass fibers can carry 1,300 simultaneous telephone conversations, compared with no more than 24 for the twisted-pair wiring currently used, an AT&T spokesman said.

The full system, running from Mosely, Va., to Cambridge, Mass., is scheduled to be completed next January at a cost of \$125 million. It is expected to save \$50 million in construction and operating costs by 1990.

AT&T's first commercial light

wave system was introduced in Chicago in 1977. Later this month, AT&T and Pacific Telephone Co. will begin operating the first 168 miles of a 633-mile light wave system planned to run almost the entire length of California by 1985, connecting major cities from Sacramento to San Diego.

## Five Routes

The company recently announced that it is purchasing 900 miles of optical fiber cable from Western Electric Co. for five new routes. The routes will be announced when the company files its construction plans with the Federal Communications Commission in March.

Last year, Bell Laboratories tested a section of undersea light wave ca-

ble 900 miles off the New England coast. The design of that system will reportedly be the basis of AT&T's proposal for a light wave system that would span the Atlantic Ocean by 1988.

One of AT&T's fiercest competitors, MCI Communications Corp., has announced that it will install a New York to Washington fiber-optic system of its own along Amtrak's right of way by the end of 1984.

"Eventually, wideband light wave communications will offer a high-quality, low-cost way to bring a variety of enhanced services — voice, data and video — directly to customers in offices, shops and homes," said Ian Ross, president of Bell Laboratories.

## Datacomm Briefs

### Naruc Takes Computer II To U.S. Supreme Court

WASHINGTON, D.C. — The National Association of Regulatory Utility Commissioners (Naruc) has asked the U.S. Supreme Court to decide whether the Federal Communications Commission's (FCC) Second Computer Inquiry Decision usurps states' rights. The association, which represents state regulators, is seeking review of a U.S. Appeals Court decision last November upholding the decision.

One of the appeals court's key conclusions was that the FCC was justified in preempting state authority. Naruc, however, in its brief to the Supreme Court said that "the express terms and legislative history of the Communications Act make it abundantly clear that Congress intended to set a limit on what federal regulatory authority would be permissible with respect to intrastate communications service."

### Pacific Telephone To Set Up Separate Sub

SAN FRANCISCO — A separate subsidiary marketing Bell and non-Bell terminal equipment will be established by Pacific Telephone and Telegraph Co. when it is divested from AT&T early next year, Pacific Telephone Chairman Donald E. Guinn announced here recently.

Calling the market for the new subsidiary "very exciting," Guinn said discussions have already begun with prospective suppliers on non-Bell equipment.

Pacific Telephone, one of 22 Bell operating companies scheduled to be separated from AT&T next January, is the first to announce plans to market terminal equipment after divestiture.

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THE INDUSTRY'S MARKET SUPPORT CENTER

# INFOMART

# Bank Set to Open \$100 Million Data Center

By Robert Batt

CW West Coast Bureau

BREA, Calif. — Security Pacific National Bank will open a \$100 million information processing center here next month that the company believes is a departure from the ordinary organization of computer operations.

The center will become the bank's primary check and statement processing center when it is inaugurated March 15. Security Pacific is reputed to be the second largest check processing organization in the U.S.

With 150,000 square feet of floor space on one level, the center is expected to be a major improvement over the bank's current operations center in Glendale, Calif., which is a

multiple-story building with only 20,000 square feet per floor. "The intention in designing this new building was to move the work flow horizontally rather than vertically within a given work space so that work flow is enhanced," explained Carl Beer, vice-president of automated data processing and the person responsible for planning, developing and coordinating the center's construction.

One of the features of the new center will be a bulk file cycle in which data is received, captured, stored, reconciled and verified before being sent to the printer room and statements area. The cycle, which takes 15 hours to complete, has until now been farmed out to the

bank's various branches.

According to DuWayne Peterson, Security Pacific executive vice-president of automated data processing, the Brea center will help the bank develop more automated customer services and make them less labor-intensive. "On-line networks and computer processing are critical to our banking effort. Brea gives us a more flexible way of dealing with work flow and allows us to coordinate and centralize activities, thus cutting down on costs," he said.

Designing the center, however, proved no easy task as Security Pacific executives attempted to predict future trends in both banking and new technology. "It's difficult to plan very far into the future in the DP are-

na because of the fast-changing environment forced upon us either by new technology, competition or legislation," Beer observed. "We found it most difficult to get a solid perspective of what the future would look like technologically at any particular point in time. We were therefore forced to build in more flexibility than we would have if we had a clear picture of where the technology is taking us."

Unlike most DP centers, the computer room is housed in the center of Security Pacific's new building. It contains IBM 3033 and 3083 systems. Peripherals equipment such as printers and sorters are adjacent to the location of a particular application. Service facilities including elevators, telephones, restaurants and restrooms have been placed on the periphery of the building.

"We wanted to provide as large a floor space as possible free of these service functions," Beer explained. "In many data centers, such facilities are often in the center of the building, where they inhibit the installation of new computers and work flow designs."

The Brea center will not replace the Glendale operation. Instead, the bank intends to split its work load between the two centers, with each acting as a contingency center to the other in the event of a breakdown.

## "This system has been faultless. We anticipated problems; we didn't have them."

Alan Lewis, Systems Manager, Thom McAn

Increasingly, companies who consider any downtime unacceptable have been turning to Stratus, a company with a reputation for high reliability that lives up to its billing. Comments by early Stratus customers indicate

that Stratus has delivered on its promise of a hardware solution to fault tolerant processing. These companies were surprised by other Stratus qualities they hadn't expected, and an operating system called "... light years ahead

of others we've had to work with," by a major Wall Street brokerage firm.

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**"I'm incredibly impressed with the quality and maturity of Stratus's software and hardware."**

Michael Feldman, Vice President, Technology Consulting Corp.

**"Anybody can learn the Stratus editor in a few minutes. I find our programmers are dealing with the applications, not fighting the computer environment."**

Tony Peraino, Software Contractor, Macomb Multiple Listing Service

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## Study Cites Need For CIS Faculty

STILLWATER, Okla. — Qualified faculty in the computer information systems (CIS) area are in high demand, according to a recent study conducted here by Oklahoma State University. The demand for qualified CIS personnel will continue into the future, it added.

The survey focused on business CIS programs in schools accredited by the American Assembly of Collegiate Schools of Business and located throughout the country. The study's research team was headed by Dr. Jeretta A. Auglar of Oklahoma State.

Participants in the survey indicated that employment of full-time faculty in the CIS area ranged from one to 30 people, while the majority admitted to CIS staffs numbering between one and six full-time people.

Utilization of part-time personnel appears to be prevalent in CIS groups, with many institutions employing up to 24 part-timers to service their increasing enrollments in virtually all areas of CIS, the survey said.

In addition, over 60% of the participating colleges and universities have reportedly hired additional faculty in the CIS area within the last two years, according to the survey.

Indicative of the high demand for CIS faculty, 70% of the respondents noted that they currently have one or more openings in this area. In fact, 50% of those surveyed anticipate more hiring over the next two years, the study said.

The survey can be obtained from Oklahoma State University's College of Business Administration in Stillwater, Okla. 74078.

## User Not Sorry It Served As Test Site for TP Monitor

By Paul Gillin  
CW Staff

BALTIMORE — AAI Corp. is not accustomed to being a first user, especially of a product as critical as a data communications monitor. But time was getting short when the company decided to shift from Mathematica Products Group, Inc.'s (MPG) Swift II teleprocessing monitor to MPG's Atlas monitor late last year.

"When our transaction rate started climbing over 30,000 a day, [Swift II] began bottlenecking badly," recalled Al Schunk, senior systems programmer. "We needed some sort of a multitasking monitor, and we had well over 100 on-line application programs to consider."

"We're generally leery about being a beta test site," Schunk admitted, "but our teleprocessing environment was so badly degraded that we were willing to take a risk for a quick performance improvement."

For that reason AAI accepted MPG's offer to become a test site for Atlas. Designed to compete with CICS [CW, Jan. 17], Atlas promised compatibility with Swift II and an interface to the Cullinet Software, Inc. Integrated Data Base Management System (IDMS) that AAI uses.

"Having some familiarity with the efficiency of Swift, we figured that Atlas was pretty good, too," Schunk said. "It has tested well and we haven't had to convert any of our programs."

### Remote Terminals

AAI, a mechanical systems development and production contractor for the U.S. Department of Defense, relies on data communications for most of its processing. All but 10 of the company's 150 on-line terminals are remote, "and requirements from users are for very heavy processing on-line," said Dave Powell, manager of data systems.

Typical on-line applications for the \$152 million company include inventory and manufacturing control, bill of materials processing, procurement information and information retrieval on almost every application. The company's two IBM 4341 Group 2 computers running under DOS/VSE and VM/CMS handle about 40,000 transactions daily.

When it originally selected a teleprocessing monitor, AAI's Data Systems Department considered CICS. "We decided CICS would be more difficult to use and maintain," Powell said. "We would have had to hire another systems programmer just for CICS."

"Atlas runs at least as well," Schunk added. "Also, the installation was a piece of cake. MPG issues a tape that is used to propagate DOS relocatable and source libraries. The tape also contains the JCL stream that's used to link-edit and assemble various modules and books to create the executable code. It's very simple and straightforward."

AAI installed Atlas and shut down Swift II the same day. Execution has been virtually flawless since then, Schunk said, except for a "thrashing"

problem when the monitor was first brought up.

"We didn't expect the paging rate to be as fast as it was, and we only had 1M byte of memory at first," he said. "Thrashing happens when the system spends more time swapping pages in and out of virtual memory than doing any real work. But we added another megabyte of memory and the problem straightened itself out."

Performance improvements were evident almost immediately, according to Powell. "Average response time across the entire system dropped from seven or eight seconds to three or four seconds."

## 'Atlas' Proves Useful For High-Volume Processing

BALTIMORE — Several features of Mathematica Products Group's Atlas data communications monitor make the package useful in a high-volume processing environment, according to Al Schunk, senior systems programmer for AAI Corp.

"A lot of our older programs are longer than they should be in terms of the memory required to execute," Schunk said. "These programs do an awful lot of I/O. Atlas has functions in which a program can transfer control to itself or to another program. That enables other programs to get on the system that might not otherwise have a shot," Schunk commented.

Schunk said his firm has also

made extensive use of a co-resident program support function provided on Atlas. "Basically it gives us the option to choose up to 20 task areas through control card options," he said. "Some of those areas can be dedicated to a specific task or tasks. If you have 10 programs that are used heavily and you've declared 20 task areas, it's likely those 10 will remain in the task area. The Atlas logic checks to see if a program is loaded before loading it again, and that cuts down quite a bit on extraneous overhead."

"That's not unusual in a teleprocessing monitor," he continued, "but Atlas does it better than any I've seen."

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# Service to Predict Congress' Votes via Data Base

By Paul Gillin  
CW Staff

BURLINGTON, Vt. — Congressional observers and lobbyists may soon find themselves turning in an unlikely direction — toward Burlington, Vt. — to determine which way the political winds will blow on Capitol Hill. Or at least that is the hope of a political scientist and developer of a specialized software package here.

Beginning this summer, a new service will be added to the Computer-Assisted Legislative Liaison; On-Line Political Evaluation (Calliope) system developed by University of Vermont Prof. Garrison Nelson. The service will forecast congressional votes on key issues using a data base

of more than 3 million pieces of information spanning Congress' last 30 years. It will be accessible via an on-line service offered by Polimetric Associates, the management company for Calliope.

Nelson's computerized crystal ball actually focuses on the 15 or 20 members of Congress most knowledgeable on each issue, those to whom other legislators turn for information. The forecasts, he claimed, will be most useful to lobbyists and to members of the news media who want to speculate on the outcome of specific votes.

"The system allows people with business in Washington to get baseline numbers they can use to forecast a vote," Nelson said. "It gives a really

quick description of where they have to do work. It can help a smart lobbyist work better."

## Newest Offering

Forecasting is the newest offering on the Calliope service, but probably not the most useful for private industry. Since its inception two years ago, Calliope's bread and butter has been a standard report system that takes all votes in Congress and breaks them down by party, region, seniority, liberalism, conservatism, business and labor orientation and presidential support.

The on-line report can be accessed by bill name, number, issue area, date of floor action and other characteristics. A client can receive a three-

page report on any bill in about five minutes, Nelson claimed. The information is generally available within 24 hours of the vote.

Calliope also offers a specified search system that pulls out a range of political and demographic information on legislators specified by the client. The data can be used to identify factors that influence the ways in which members vote.

A customized report feature allows clients to generate reports based upon their own specifications, such as contributions to political action committees or the volume of the client's business in a specific district. "The corporation may discover an alliance it can strike up with a trade association or another corporation which would broaden its influence within the Congress," Nelson said.

## Specialty Programming

Calliope also offers specialty programming in which, for example, a chart of congressional characteristics can be merged with a client's mailing list. Such data can be used to lobby members in a certain geographic area.

The Calliope service combines a data base management system with an analytical package written by Nelson. Members of Congress are listed with more than 60 political and demographic variables, plus committee assignments and voting records.

Service bureaus currently offering Calliope include Interactive Computing of Vermont, South Burlington, Vt., and Dialcom, Inc. of Silver Spring, Md. Nelson said the services will also be available from American Management Systems, Inc.

The method is the culmination of 15 years of teaching and research experience for Nelson, who holds a Ph.D. in political science from the University of Iowa. Nelson has specialized in quantitative applications in political science for 12 years and has been a staff member for Sen. Patrick Leahy (D-Vt.).

Despite the apparent breadth of Calliope services, Nelson said the company has only four current customers. One user at the *National Journal*, published by Government Research Corp. in Washington, D.C., said the company's lack of marketing focus has kept the service obscure.

"Nelson has made an extremely valuable information process which, if people would learn more about it, would be tremendously helpful for research on Congress," Jennifer Detoro, director of information systems for the *National Journal*, said. "On election day, for instance, we used it to identify losers in the [House of Representatives], their votes on some major bills and their ratings by major rating bodies. Then we compared them with the House as a whole."

Nelson said the standard report and specified services cost \$150/mo for a minimum one hour of connect time with a \$112/hour charge for up to five hours of service and \$100/hour thereafter. An extended time contract for more than 100 hours of connect time costs \$5,000/year.

Polimetric Associates is located at 176 Battery St., Burlington, Vt. 05401 and at 2950 University Terrace N.W., Washington, D.C. 20016.

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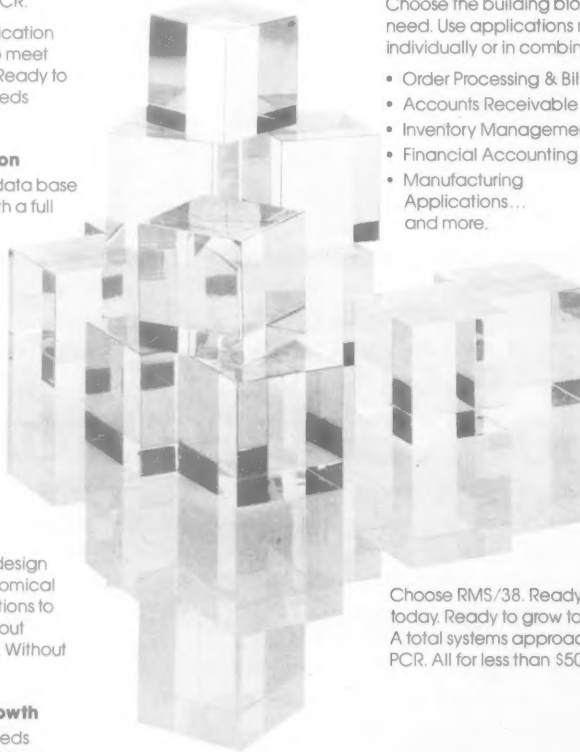
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# An Interview With a Computer Pioneer

How do your machines — the first electric digital computer and the ones you built during the war — differ from today's machines?

They were all binary... but the elements that were used to get binary operation in the early computers were the telephone relays. Following that, of course, the vacuum tube took over and after that the transistor and after that the integrated circuit, and I don't know what will be next. But the basic logic is pretty much the same, it has been ever since the third of the relay computers. Speeds have gone up by at least 1,000:1, and the size and costs have come down at least 1,000:1 in the intervening years.

You mean it cost more to build a computer then than it does now?

Oh, much, yes. For instance, I have

one of these little pocket calculators, which can do a few things — multiply, divide and add — and I think they are running about \$7 to \$8. The first one [computer] that did the complex multiplication and divisions was \$20,000. So that's come down at least 1,000:1.

The first machine I built was about 8-feet high, 6- to 7-feet across and maybe a foot thick, as it was on telephone relay racks. This one today, as you can see, is no more than a hundredth of the volume of that.

It took about 30 seconds to do a complex multiplication, which involved four ordinary multiplications of real numbers. At present, you can get a multiplication of real numbers in well under 30 microseconds. So the speeds have gone up more than 1,000:1.

Does the process of developing computers take longer today be-

cause the machines are more complex than they were 30 years ago?

Computer design hasn't changed too much. It took us nine to 10 months to

design and build the digital binary computer — the complex No. 1 — and the big one that went to Aberdeen University probably took about (Continued on Page 16)

## George R. Stibitz

Dr. George R. Stibitz, credited with the invention of the first electric digital computer, was inducted into the U.S. Patent and Trademark Office's National Inventors Hall of Fame in Arlington, Va., during National Inventors Day ceremonies earlier this month. An exhibit describing the evolution of Stibitz's first computer is on display at the hall.

The recipient of 34 patents for inventions ranging from computer systems to a stereophonic organ, Stibitz was interviewed recently by Computerworld staff writer Patricia Keefe.

Stibitz began as a research mathematician at Bell Laboratories, where he developed the first electric digital computer. Work on the project began in 1937, when Stibitz took home some spare relays and created a binary adder that proved binary numbers could be added with relays.

Stibitz then worked with Samuel Williams, a switching engineer at Bell Labs, to apply the basic theory of the binary adder to the design of what he called a Complex Number Calculator.

The system took about 10 months to develop, occupied an entire closet and could divide two eight-place numbers in 30 seconds. It was publicly demonstrated for the first time in 1940 using a teletypewriter in Hanover, N.H., which was connected to the calculator at Bell headquarters in New York via telephone lines — possibly the first demonstration of a remote data link.



While extraordinary for its time, the first relay computer was limited to the four basic arithmetic functions.

During World War II, Bell Labs loaned Stibitz to the National Defense Research Council. Stibitz and Bell engineer Ernest Andrews designed four more computers between 1942 and 1945, for the control of anti-aircraft guns and missiles. These included the first programmable computer and incorporated such innovations as automatic round-off and the floating decimal point.

Stibitz left Bell after the war to work as an independent consultant. Since 1964, he has been affiliated with Dartmouth Medical School both as a researcher and physiology professor.

## "Cytrol software customers... improve performance, save time, cut costs by going on-line with CYX."

Norfolk and Western Railway's CYX-based Norfolk Coal Inventory System works out the complex logistics of preparing and routing coal orders, helping the NW to break monthly coal dumping records.

By using CYX to build the Fully Integrated Reservation System for Travel (FIRST), Tymshare, Inc. cut months out of their production schedule — time that would have been spent developing their own untested transaction processing system.

Union Carbide's new Material Acquisitions Data Processing System is relying on CYX to economically distribute transaction processing capabilities to chemical plants across the country.

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## An Interview With a Computer Pioneer

(Continued from Page 15)  
a year. You can't get much of a computer nowadays designed from scratch in less than a year. I'm not talking about production, of course, just the design.

As a professor in the Physiology Department at Dartmouth Medical School, you have been using computers and mathematics to study biomedical problems. How are computers used in these studies?

We use a New England Digital mini-computer, which we've found very useful for the work that we're doing here because we can set it going and it doesn't cost us much to run. It's also useful in the laboratory. It's set

up with a pretty good interface with the physical world so that you can use it to measure, for example, the response of a cell membrane to an electrical impulse applied to it, analyze the data and so on.

One of the problems I worked with for a while had to do with the respiration of the cat. The computer receives signals, analog-to-digital conversion from such things as oxygen temperature, the rate of respiration and a number of things of that sort which a computer saves on floppy disks and later performs detailed analysis.

Some analysis goes on during the experiment so that by the time the experiment has ended, or even before then, the experimenter has a chance

to see what's happening through the variables. If something is wrong, he can stop the experiment and start over again. The experiment may last half a day so that it's quite important to be able to detect any trouble that's occurring before you've spent a lot of time on it.

We also have access to the Dartmouth College computing center by telephone connections — that's primarily a Honeywell [Inc.] one ... It works through a time-sharing system. It runs, overloads when you have more than about 180 to 200 users. Very often that happens so that frequently, it is more convenient to have a minicomputer, or even a micro, than it is to use the time-share system.

I use an [Apple Computer, Inc.] Apple at home. Many times the Apple does things that the time-share system can't do.

**How does the sophistication of today's computers aid research and development efforts in comparison with systems 10 and 20 years ago?**

The equipment of today is far more elaborate and sophisticated. A researcher can set up a model, tell the computer what it wants to do and feed it situations.

Minis and micros have helped researchers a lot, they can do things small computers couldn't do, even 10 years ago. Research is faster you could say, I suppose — more exact in a sense that you can set up pretty elaborate equations and take more variables into account. You can come a whole lot closer to expressing the real system of a model today.

**Where can we expect to see growth in technology in the future?**

Software or programming will probably be made more easy and reliable. Software, you know, is about 10 years behind the capability of hardware today.

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## Ansi Catalogs 10,000 Standards

**NEW YORK** — The 1983 edition of the "Catalog of American National Standards" has been released here by the American National Standards Institute, Inc. (Ansi).

The 192-page text lists about 10,000 current Ansi-approved standards on dimensions, ratings, terminology, symbols, test methods, performance and safety requirements for a wide range of materials, including those used in the production and maintenance of information systems.

The cross-referenced catalog is available for \$10, and subsequent supplements are free, the publishers said from 1430 Broadway, New York, N.Y. 10018.



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'You Quivering Lump of Indecision!'

# Micros Seen Receiving Mixed MIS Reception

By Bob Johnson

CW New York Bureau

NEW YORK — Are personal computers and professional workstations being greeted with open arms by large companies' management information systems (MIS) organizations, or is user interest force-feeding them into corporate information systems?

It's a toss-up, a recent *Computerworld* survey of personal computer users and MIS managers in the New York metropolitan area found. Although some corporate users of personal computers complained of a lack of support from the MIS group, an almost equal number of MIS respondents reported that there is indeed support and in some instances a real effort to integrate personal computers into large corporations.

Bob Petrie, an assistant vice-president of Manufacturers Hanover Trust Co.'s Wholesale Management Information Services Group, said his company's MIS group did not give him any encouragement when he began using a Heath Co. 89 microcomputer on his own about 1½ years ago. The only notice or approval of it came from his department head.

"We've loaded the Heath up with software packages for terminal access and data base access ourselves. As a matter of fact, we give the MIS Department demonstrations showing them how we use it. It's almost a matter of reverse education here," he said.

The large systems people have acquired a "handful" of IBM Personal Computers for the bank, Petrie said, but they never told users how the micros work. At the same, he admitted, they are not necessarily "hostile" about end users having their own micros.

A section of the MIS organization concerned with office automation has received a corporate mandate to spearhead personal computer integration. "This office automation group is responsible for getting ex-

perience on personal computers, setting policy and teaching end users how they work. It is this group that is promoting their use, not the MIS area," Petrie stated.

When asked why the MIS area has not shown more interest in personal computers than an office automation group, Petrie explained that the OA people have the end user's interest at heart while MIS is so immersed in the daily running of the mainframe shop that it does not have the time to work on micro integration.

Another user, who asked not to be identified, said an IBM Personal Computer was introduced into his investment management group against the advice of the systems department. "We have gotten absolutely zero support from the MIS Department," he said. "It took us two years [one year in learning introductory aspects] to come up with the software for the [Personal Computer], which the MIS people wanted to do on their [IBM] 370 mainframe. But now we do

(Continued on Page 18)

## Group Formed for Micro Managers

NEW YORK — A new association has been formed here to champion the cause of a new breed of computer professional.

The Microcomputer Managers Association (MMA) was established about seven months ago to "coordinate the ideas and principles of the management of microcomputers in the organizational structure," according to its president and founder, Alan Gross of International Paper Co. The MMA membership includes nearly 40 people known by a variety of titles — "microcomputer manager," "personal computer liaison" and "small systems specialist," for example, — from such companies as

Bankers Trust Co., Chase Manhattan Bank NA and New York Telephone Co.

Whatever their titles — Gross himself is known as microcomputer product consultant — MMA's members are the people within their respective companies whose responsibilities include buying and installing microcomputers and training users to use them. Thirty percent to 40% of the large companies in the U.S. have at least one microcomputer manager, according to the organization.

The MMA is not a typical users' group, according to Gross. Instead, "we are generally made up of the people who take care of control-

ling microcomputer use or end-user computing where time-sharing is included. Our members' duties usually include the integration of microcomputers into the management structure so things don't become helter-skelter.

"We are attempting to give the microcomputer manager a forum where topical subjects about this kind of microcomputer management can be aired. We want to allow managers to share information in this field," he said.

More information on the MMA can be obtained from Gross at International Paper Co., Room 36-3, 77 W. 45th St., New York, N.Y. 10036.

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# Study Finds Mixed Micro Support From MIS

(Continued from Page 17)

what they wanted to do on the big machine, and they [MIS] hope it falls flat on its face."

The lack of support from MIS did not surprise the user, who said he felt MIS made a decision not to push for microintegration. "We wanted an IBM [Personal Computer], some other department wanted a [Commodore Business Machines, Inc.] micro and so on. The MIS Department has not come up with a conclusive standardization policy," he said.

But not all MIS departments are unconcerned about personal computers. An ambitious effort to integrate microcomputers is occurring at Columbia Pictures Industries, Inc. in New York.

"We decided that microcomputers would be important to help lighten the MIS Department's load," recalled Margaret Levine, manager of microcomputers at Columbia. "Our purpose is not to get a microcomputer on everyone's desk, but to have users use software packages for their work without having a programmer set them up."

## Spreadsheet Trading

Being the MIS person responsible for standardization of personal computer hardware and software, Levine has observed that Columbia's MIS coordination is allowing users to trade spreadsheets and send diskettes to each other to help in their work.

Centralized support from the MIS area is an essential part of making data secure, an issue of concern whenever micro integration is discussed, Levine said. "We educate users about the backup of data; we try to show them how to back up their own files. This will also help MIS in the long run as local-area networks grow. As data becomes more centralized, information from the microcomputers will be easier for the MIS department to back up on the mainframe."

Users also feel more secure using a microcomputer for sensitive data. "Many users are uncomfortable about putting their work up on a mainframe where almost anyone can access it," Levine pointed out.

"Someone who has disks locked up in his desk has a pretty secure system."

Positive MIS involvement with microcomputers is also happening at International Paper Co. here, according to Allen Gross, the company's microcomputer product consultant. The company has set up a center at which several vendors' hardware is displayed; the center also offers consulting services and microcomputer training classes.

"Although we are not strong advocates of personal computer use, we realize that they will be used and there is a need for good support. Through our information center we offer whatever services we can provide for users," Gross said.

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## Micro Fears Seen Haunting MIS Groups

NEW YORK — Lack of standardization, the use of many different vendors' products, inconsistent input and output and security breaches are some of the fears about personal computers that haunt management information systems (MIS) departments.

Adding to those fears is the fact that because of micros' easy availability and low cost, users who meet resistance from their corporate MIS groups can buy their own computers. That means "some kind of coordination as to operating systems and networking standards must be set to prevent problems later on," observed Susan Perricone, president of the Systems Advantage Ltd. consulting company here.

Perricone offered two different examples of corporate attitudes on users buying their own personal computers: "I have been trying to sell a small system to a major pharmaceutical company for quite a while now, and the department cannot buy it until MIS gives the OK. On the other hand, someone from a large bank bought dozens of IBM Personal Computers and he is now worrying about how he is going to tie them all together."

John Gosden, vice-president and technology officer at the Equitable Life Assurance Society in New York, takes a different approach to satisfying users' microcomputer needs. A Personal Computer Advisory Service (Pcas) has been set up within the company to advise users and to standardize the purchase of personal computers.

"We foresaw the problem of microcomputer proliferation and confusion and thus formed Pcas from the Technical Services Department about a year and a half ago. Users who want to purchase personal computers can by and large get the support they need. They can even use a handbook that we have published on the subject of picking a microcomputer," he stated.

Users can get "automatic approval" for purchasing a personal computer without MIS interference if Pcas condones the purchase.

## Japan's Public Schools Seen Remiss in Computer Field

By Susan Blakeney  
CW Staff

TOKYO — Say "Japan" and images of a superefficient, computerized, highly automated micronation immediately spring to mind.

However, these images do have one apparent flaw. While Japanese industries apparently have a firm grasp and knowledge of computer technology, the country's public school system is apparently remiss in this department.

For example, only .03% of Tokyo's public schools currently have computers in their classrooms, according to recent reports. This dearth of computer education is leaving Japan's computer industry with the responsibility for either training its work force from scratch or recruiting people from technical and vocational schools — an educational path often frowned upon.

"You really have to go to a private school in Japan for computer education," admitted Nazuna Comfort of the Education Department at the Japanese embassy in Washington, D.C.

On a recent visit to Japan, Dr. Lloyd C. Neilson, superintendent of schools in Roseville, Minn., and president of the American Association of School Administration, was surprised at the discrepancy between the Japanese high-tech industry and its lack of computers in the classroom. Neilson reported that the one public school he found in Japan that used computers had "primitive" equipment that looked more like calculators than computers, and programming courses were virtually nonexistent.

"There is one system of learning in Japan," Neilson explained. "The school system focuses on cognitive learning, whereas our goals are broader. We try to teach students how to interpret and apply information — they don't."

He added that computers are being widely used in his Minnesota school district as well as in public education systems throughout the U.S.

While Japan's public schools systems are reportedly behind those in the U.S., there is definitely no lack of interest in computer education in that country, Neilson observed. "All the educators I spoke with were interested in broadening their curriculum like our schools."

Neilson placed part of the blame for Japan's poor high-tech educational system on the Ministry of Education there. While the ministry is responsible for the island nation's public school system and should see that students are adequately groomed and prepared, it is notoriously slow to respond to change.

Jerry Wasserman, manager of strategy formulation practices for the information industry at Arthur D. Little, Inc. in Cambridge, Mass., and a frequent visitor to Japan, offered another reason for the Japanese deficiencies in computer science training. He claimed there are no computers in Japanese public schools because the Japanese language does not easily lend itself to the computer.

"It's a cultural difference," Was-

serman said. "If young children were to use a keyboard, it would have to be in Japanese. The problem is there are 2,500 different symbols in the language. Kids have to learn English first," he argued.

While English is taught as the primary second language in Japanese schools, its use for computer education does not necessarily follow, Wasserman explained. "We'll keep ahead of Japan in this area because it's our language that's universal."

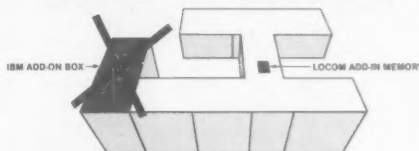
The U.S. industry must also "start from scratch" in making its recent college graduates computer functional, he pointed out. "Japan's no different from here in that respect."

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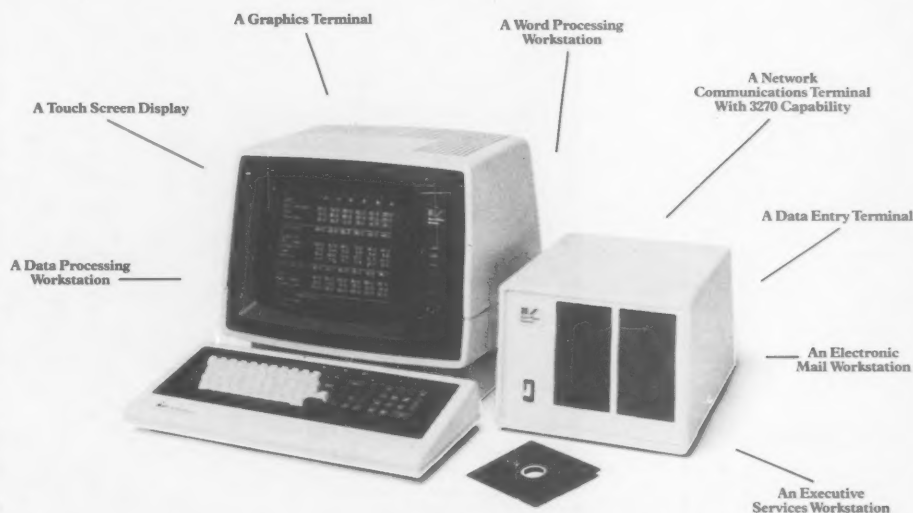
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## Insci Head Committed To Personnel

By Bob Johnson

CW New York Bureau

NEW YORK — Supported by \$4.5 million in recent funding, the chairman and chief executive officer of Information Science, Inc. (Insci) is committing his firm to the integration of human resource applications with data bases, an area he claimed has lacked proper attention.

Companies usually assign more bottom-line-oriented applications a higher priority than human resources — an unfortunate situation because 50% to 75% of a company's costs are people costs, Insci's Leo Kornfeld pointed out. "Personnel, payroll, pension administration, health and safety — these are all areas that have been traditionally looked at as being needed but not all that important. The DP side of companies has been especially guilty of downplaying the importance and integration of these applications, probably because of its image and the lack of comprehensive software," Kornfeld said.

But this will change with the integration of human resource applications with data bases. "Data bases provide the opportunity to make applications products more usable. This is very important in the field of human resources because it gives employees and human resource personnel true on-line interactivity," Kornfeld maintained.

Kornfeld described data base technology as a "boon" to the human resources area and advised DP managers to get more involved with the development of these applications. "This area will become increasingly more important to companies overall. DP executives should push the human resource cause. These fields of personnel, payroll and so on are becoming increasingly more complicated and they require effective information processing. When chief executive officers need information about manpower costs for budgeting reasons, for example, a comprehensive data base will shine."

The Insci president predicted that employees will soon be able to sit down at a terminal with a nontechnical human-resource specialist and access all pertinent information about the employee and the company's people information. "Companies will now be able to satisfy almost all of their employees' questions about pension plans, benefits and so on," Kornfeld noted.

## First User of T/S Payroll/Personnel

By Paul Gillin

CW Staff

BALTIMORE — Payroll and personnel are two applications that growing companies often move in-house when time and money allow. But the Provident Savings Bank here recently bucked the trend by moving those applications off an in-house computer and becoming the first user of a payroll/personnel service provided by a

time-sharing bureau.

The outcome, according to a bank official, has been significant cost savings as well as improved efficiency in the bank's personnel operations.

The decision to use the service was made in large part because of the bank's size, according to Richard Isacoff, its vice-president and director of human resources. The bank's payroll package, which was "basically writing

checks," needed to be upgraded, but "with 600 employees, it just didn't pay to buy, install and maintain an in-house system. It would have cost \$40,000 to \$50,000 to buy the right package, and the maintenance is about the same as running a time-sharing system."

"On top of that," he observed, "there are special security issues when you go in-house. With a salary budget

of \$8 million, we wanted to make sure we were spending it in the right place. You don't monkey around with people's paychecks."

Before joining Provident Savings, Isacoff worked for a bank that sold payroll services. He had evaluated a variety of personnel services available via time-sharing — including offerings from Information Science, Inc. (Insci), Comshare, Inc. and



# Service Cites Cost Savings, Personnel Efficiency

ADP Network Services, Inc.

He had also evaluated software packages from National CSS, Inc. and Genesys Software Systems, Inc. Insci's personnel administration system offered "the best price, the most flexibility and the least 'user-unfriendliness,'" Isacoff said.

When Isacoff heard that Insci was adding an integrated payroll function to its time-shared service, Provi-

dent Savings signed on as a first user.

## Alters Record Keeping

Provident converted to the Insci service earlier this month. In addition to the \$40,000 one-time cost savings, the service has enabled the bank to alter dramatically its record-keeping structure.

"We had been using DP for payroll to do faster what

we've always done by hand," Isacoff said. "Now we're learning how to do it better. The computer is changing the way we do business."

The service integrates the payroll and personnel data bases so that only one entry is required to add or update an employee's records. Each employee fills out a data collection form and the information from it is input into the data base by the human

resources department.

"The basic human resource system includes just about all the employee data we would want, from address to compensation to performance evaluation," Isacoff said. "We use the basic personnel record to create a basic salary file and we only need to update one file. That eliminates the need for edit runs."

The system tracks staff

movement throughout the organization and adjusts departmental budgets accordingly, "so we're comparing apples and apples," Isacoff said. Additionally, it provides quarterly tax reports automatically — "nothing unique, but something we used to do manually."

Because payroll and personnel are integrated, the vice-president said, the service is self-auditing. "It's very easy to make sure you only have one payroll and one personnel file," he said. "It's much more difficult to create a false payroll file this way, although it's always possible."

Security is multilevel, based on the need to know certain information, he added. "Certain functions are restricted to certain people and only three employees have the ability to update files," he said.

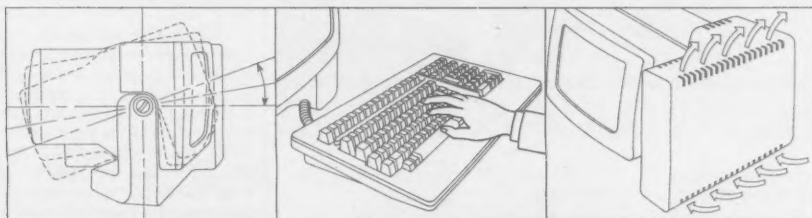
## Meet to Cover IBM's Impact On Its Users

NEW YORK — The impact on users of IBM's products, technology and financial plans through 1988 is the subject of a seminar that will be held here March 14-15 by Techtran, a subsidiary of Gartner Group, Inc.

Gideon Gartner, founder and president of the Gartner Group, will keynote the conference with an overview of IBM's strategies for the '80s. Other speakers include Martin Sprinzen, vice-president, Candle Corp.; Jerry Eisen, president, Office Systems, Inc.; Bob Van Hellemont, senior vice-president, CMI Corp.; and Peter Wright, vice-president, Gartner Group.

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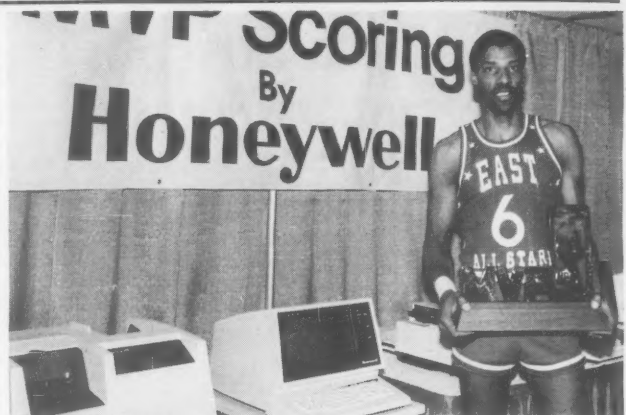
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Julius Erving of the Philadelphia 76ers pauses near the Honeywell, Inc. DPS 6/32 computer that just minutes before had named 'Dr. J' Most Valuable Player of the 1983 NBA All-Star Game. The game was played Feb. 13 at the Forum in Los Angeles [CW, Feb 7].



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## IDC to Host Spring Sessions On Micros in DP

FRAMINGHAM, Mass. — "Getting Ready for the Micro" will be the focus of the 1983 spring Information Industry Briefing Session conducted in four U.S. cities by International Data Corp. (IDC). The briefing session will be held in Boston March 4; Washington, D.C., March 7; Chicago, March 10; and Los Angeles, March 14.

The meeting will analyze current trends and prevalent technologies in the microcomputer arena and will include sessions on graphics, office automation, software and services, buying patterns and the strategies of AT&T and IBM. There will also be a half-day session on "Federal Government Markets" for microcomputers and related equipment and a luncheon session titled "Buying Your Own Computer."

Registration costs \$395 for the first member of an organization and \$345 for subsequent members. Further details may be obtained from IDC at Five Speen St., Framingham, Mass. 01701.

## Meet to Cover DP Graphics

CHICAGO — "Graphics At Work" will be the theme of the National Computer Graphics Association's (NCGA) 1983 conference, which will take place here June 26-30.

Over 200 sessions will be conducted at this event on topics ranging from computer-aided design (CAD) to medical and educational applications of graphics systems, according to show sponsors at NCGA. Business and scientific graphics subjects covered will include strategies for integrating computer graphics into the organization, graphics in the information center, data base linkages and innovative applications of computer graphics.

Registration fees vary from \$125 to \$795, depending on session choices. Further information can be obtained from NCGA headquarters at 8401 Arlington Blvd., Fairfax, Va. 22031.

## 'Cars of Tomorrow' News High-Tech Autos Stop The Show

By Bob Johnson

CW New York Bureau

NEW YORK — Hardware with a multimicroprocessor design, a touch-sensitive CRT with graphics, voice-activated control and satellite communications capabilities. That might sound like a new computer system, but when it was introduced here recently, it also had four wheels.

Automobiles incorporating all aspects of high technology were on display at the 1983 Greater New York Automobile Show, and the show stoppers were those with the most electronic gadgetry.

Nearly all of the 700-plus cars exhibited by U.S., European and Japanese manufacturers had some sort of computerized control designed into them. Familiar features such as electronic engine control, LCD dashboard readouts and computerized trip odometers graced many of the currently available production cars. New features like computerized mechanical and maintenance monitoring and interior temperature control were also on display.

The biggest attractions, however, were the cars billed by their makers as the "cars of tomorrow." And although much of the technology used in those cars has been around the computer industry for some time, its application in conjunction with America's traditional object of love proved to be another step toward general public acceptance of computer technology.

All of the "big three" manufacturers had their future cars on hand. Chrysler Corp. displayed its "Electronic Voice Alert" feature, which, the company claimed, is capable of compiling and processing information for 11 mechanical and safety functions, as well as giving the driver recorded voice reports. For example, if there are no problems when the car is started, the electronic voice will tell the driver, "All monitored systems functioning." The electronic voice is available in several languages, including English, French and Spanish, according to Chrysler.

One of General Motors Corp.'s "high-tech" automobiles at the show was the Buick Questor. The Questor, billed as "coming from the computer age," boasts a computerized road atlas that visually charts the driver's progress as he travels and a traction monitor that "feels" the road and recommends a safe driving speed for existing road conditions.

A spokesman manning GM's Chevrolet Division exhibit, John

### Handbook Details Service Companies

PALMYRA, N.J. — *The Handbook of Independent Service Companies*, a "how-to" text offering nine steps to help management information systems managers evaluate independent service companies, has been released by the Service Research Group.

The book reportedly includes listings on hundreds of geographically indexed service companies.

It is priced at \$995 from Service Research, P.O. Box 335, Palmyra, N.J. 08065.

Berto, said that the 1984 Corvette will feature a "fully computerized dashboard" and will be labeled as Chevy's technical leader.

Perhaps the most ambitious and technologically advanced entrant in the show's high-tech arena was Ford Motor Co.'s Continental Concept 100.

Besides having a microprocessor on board for just about every function from front sonar-detection display to a rear seat Intellivision game, the car contains a 16K-byte Zilog, Inc. Z80A microprocessor hooked up to a 9-in. CRT capable of graphics display.

According to Mark Jarvis, a prod-

uct design engineer at Ford's Electrical and Electronics Division in Detroit, the microprocessor's main functions are interior temperature-control activated by the touch-sensitive screen and supplying the driver with navigational data by linking up with a Navy communications satellite.

Jarvis explained that the car picks up latitude and longitude information from the orbiting satellite and the microprocessor translates the data onto a graphic map internally stored in the computer and shown on the CRT. The graphics present a moving symbol that represents where the car is located.



CW Photo by B. Johnson

Ford's Concept 100 has a 9-in. CRT that can display graphics.

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## Officials Say Patriotism Played Small Part in IBM vs. NAS Choice

HOUSTON — Officials say the incident was overplayed by the general press, but they admit that patriotism played at least a small part in Harris County's recent decision to buy an American computer rather than a less expensive Japanese model.

Harris County will take delivery late this month on

an IBM 3083-B mainframe at a total cost of \$2.6 million after rejecting a National Advanced Systems, Inc. (NAS) bid for an AS/9040 processor priced at \$2.3 million.

The decision probably would not have generated much publicity but for a small item in the committee's recommendation: "There were feelings expressed that

in a time of heavy unemployment in the U.S., it would not seem proper to buy a machine that is basically produced by Hitachi [Ltd.] of Japan and only retrofitted to American specifications in the U.S."

The decision received considerable media coverage for its "buy American" slant. One article quoted a county official as questioning whether the IBM machine was worth the extra cash.

But County DP Director Frank Curcio said patriotism was not a significant factor in the committee's decision. "We preferred the water-cooled IBM over the air-cooled NAS because we already had the water cooling installed," Curcio said. "The NAS would have required about 10 times as much air conditioning."

"Also, we know we're going to have to grow this machine. To move to an NAS AS/9070 would double our air conditioning requirements, and we would possibly have had to add another computer room. The [buy American] concern was expressed by the committee, but it was blown out of proportion," Curcio said.

## Karlstrom Wins Award

ORLANDO, Fla. — Karl Karlstrom, senior editor for computer science at Prentice-Hall, Inc., last week received the Annual Award for Outstanding Contribution to Computer Science Education from the Association for Computing Machinery's (ACM) Special Interest Group on Computer Science Education.

This is the first time a person other than an academic has been honored. Karlstrom accepted the award at the group's recent annual ACM Computer Science Conference.

Karlstrom, also an assistant vice-president at Prentice-Hall, joined the company in 1951. In the late '50s, he met a professor writing a book on data processing.

Although he was unfamiliar with the subject, Karlstrom informed the business books editor about it. The editor wrote back, "I have traveled the length and breadth of this country and have talked to the best people in business administration. I can assure you on the highest authority that data processing is a fad and won't last out the year."

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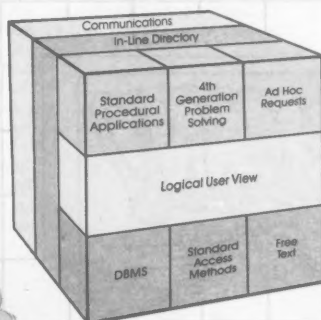
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## Calendar

### Week of March 6

March 9-11, San Francisco — **Minicomputer Systems: Guidelines for Successful Selections.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

### Week of March 13

March 13-16, Carmel,

Calif. — **Advances in Office Automation.** Contact: Laurie Goldstein, Institute for Graphic Communication, Inc., 275 Commonwealth Ave., Boston, Mass. 02115.

March 13-16, New York — **1983 Trust Operations and Automation Workshop.** Contact: American Bankers Association, Communications Group, 1120 Connecticut Ave. N.W., Washington,

D.C. 20036.

March 14, Boston — **Executive DP Seminar.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

March 14-15, Washington, D.C. — **Estimating Software Costs.** Contact: Data Processing Management Association Education Foundation, Dept. ESC, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

March 14-15, New York — **IBM Futures (1983-1988) — Taking Control of Its Market.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

March 14-15, Summit, N.J. — **ANS Cobol.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

March 14-15, Atlanta — **How to Use Desktop Computers in the Professional Design Firm.** Contact: Terri Connell, EMA Management Associates, Inc., 1145 Gaskins Road, Richmond, Va. 23233.

March 14-16, Seattle — **Conflict Management in the**

**DP Environment.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

March 14-16, Hartford, Conn. — **DL/I Application Programming Workshop.** Contact: New England Data Services, P.O. Box 92, Guilford, Conn. 06437.

March 14-16, Washington, D.C. — **Managing Data Processing Systems.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

March 14-16, Carmel, Calif. — **Automated Office of Tomorrow.** Contact: Institute for Graphic Communication, Inc., 375 Commonwealth Ave., 4th Floor, Boston, Mass. 02115.

March 14-16, Tempe, Arizona — **Fiber Optical Communications.** Contact: Center for Professional Development, College of Engineering and Applied Sciences, Arizona State University, Tempe, Ariz. 85287.

March 14-16, Washington, D.C. — **Managing Data Processing Systems in Multi-project Environments.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

March 14-16, New York — **Long-Range Information Systems Planning.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

March 14-16, Boston — **Improving Automated Receivables and Credit Management Systems.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

March 14-17, West Berlin — **Computer Graphics Applications for Management and Productivity (Camp '83).** Contact: AMK Berlin, P.O. Box 1917 40, Messendamm 22, D-1000, West Berlin 19, West Germany.

March 14-17, New York — **Basic Vsam.** Contact: Software Education Corp., 1114 Ave. of the Americas, 37th Floor, New York, N.Y. 10036.

March 14-18, New York — **CICS/VS Macro Level Applications Programming.** Contact: Rosa Roseta, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

March 14-18, Los Angeles — **CICS/VS Applications Programming.** Contact: On-Line Software International, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024.

March 14-18, New York — **CICS Macro Level Programming.** Contact: Sysed, 1 Park Ave., New York, N.Y. 10016.

March 14-18, Boston — **Financial Modeling.** Yourdon, Inc., 1133 Ave. of the Ameri-

cas, New York, N.Y. 10036.

March 14-18, New Orleans — **IMS Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

March 14-15, Summit, N.J. — **ANS Cobol.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

March 14-15, Summit, N.J. — **OS/370 Assembler.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

March 14-15, Summit, N.J. — **Assembler Language Coding.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

March 15-17, Houston — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

March 15-18, Los Angeles — **Hands-On Unix Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

March 16-17, Dallas — **Developing Small Computer Applications in Government.** Contact: U.S. Professional Development Institute, Dept. 1, 12611 Davan Drive, Silver Spring, Md. 20904.

March 16-18, Los Angeles — **Multiuser Communication Systems and Networks.** Contact: Continuing Education Institute, 5410 Leaf Treader Way, Columbia, Md. 21044.

March 16-18, Toronto — **Intermediate APL.** Contact: Numetrix Seminar Administrator, Numetrix, Ltd., Suite 600, 3 Church St., Toronto, Ont., M5E 1M2, Canada.

March 16-19, Chicago — **Systems Project Management.** Contact: Arthur Andersen & Co., 69 W. Washington St., Chicago, Ill. 60602.

March 17-18, Boston — **Software: A Legal Briefing for EDP Professionals.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

March 17-18, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

March 17-18, Providence, R.I. — **Effective DP Project Management.** Contact: The Center for Management Development, Bryant College, Smithfield, R.I. 02917.

March 19, Silver Spring, Md. — **Introduction to Pascal.** Contact: Linda Zurndorfer, IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

## Henco User Conference Set for Orlando, Feb. 27

ORLANDO, Fla. — The Henco Software, Inc. Users Group's Second National Conference is slated to take place here Feb. 27 to March 3.

The 1983 program focuses on Henco software products for personal and departmental computing applications, according to a vendor spokesman. Topics on the agenda will include the analysis, design and implementation of Henco's proprietary Info relational data management systems; managing macro libraries and large data bases with Info; use of Info for college administration, market analysis, manufacturing management and materials requirement planning.

Conference registration costs \$175. Details are available from Henco, 100 Fifth Ave., Waltham, Mass. 02154.

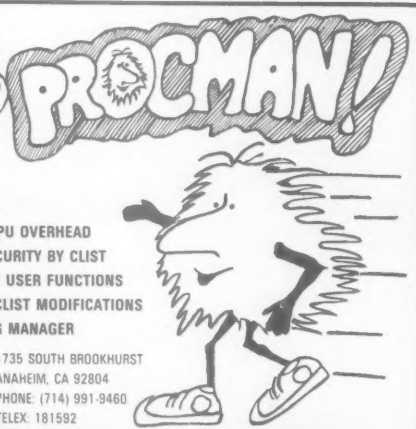
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## EDITORIAL

### A Friend of Ours?

There's something very uncomfortable about the recent selection of Adm. Bobby R. Inman as president and chief executive officer of Microelectronics and Computer Technology Corp. (MCC), the multivendor research and development venture spearheaded by Control Data Corp. [CW, Jan. 31].

The fact that Inman, former head of the National Security Agency (NSA) and deputy director of the Central Intelligence Agency, has no corporate management experience or technical background alone raises questions about the wisdom of putting him in charge of this high-visibility, high-risk undertaking. Even more noteworthy is the fact that during his very successful career as one of this nation's top spies, Inman showed that he is no friend of the DP industry.

Inman is the man who one year ago suggested that published data on advanced research in computer hardware and software and other sophisticated electronics is a threat to national security and should be subject to government censorship. The admiral backed down from that position before pointed congressional questioning, and his thesis was convincingly refuted by a subsequent study by a National Academy of Sciences panel, but not before his statements provoked a storm of outrage in the industry.

Inman insisted last year that his statements on technology and national security were made not as a government official, but as a concerned private citizen. If we are to take him at his word, we can only infer that he is philosophically opposed to the aggressive and unfettered R&D that has made the American DP industry so successful.

In a recent interview [CW, Feb. 14], Inman said MCC research will give the participating firms a three-year lead in the resulting technological developments. This is just about the lead NSA reportedly strives to maintain over mainstream commercial electronics. As head of NSA, Inman showed how very interested that agency is in advanced technology developed by private firms. Can he really be expected to guard MCC secrets if his former buddies in the intelligence community come calling? Maybe, but doubts will always linger.

Inman, as an executive of the high-tech intelligence world, proved himself to be a skilled politician and is, no doubt, a master at keeping secrets; both of these attributes will serve him well as head of MCC. But what else is there about Inman to recommend him for this job? According to a CDC spokesman, Inman was chosen for the top MCC job because "he understands the role electronics plays in the national and international scene." Based on his past actions, however, we're not sure he understands its proper role.

Given the importance of MCC and its possible off-spring, we wish Inman and MCC well. But in light of his past performance vis-a-vis the high-tech industry, his appointment is not only uncomfortable, it's downright spooky.



## LETTERS

### Eliminating a Good Market

California Computer Products, Inc. read with regret the article "Houston Dropped as NCC '84 Site" [CW, Jan. 24]. As a long-time National Computer Conference exhibitor, we have been to many cities for the NCC show, and each city has its pros and cons.

It is, perhaps, worth pointing out that the so-called appalling conditions in Houston that the Shugart Associates' trade show coordinator speaks of in the article did not keep the more than 90,000 individuals (an all-time high) from attending.

Our concern is that by eliminating Houston as a site, a large market — and for us a very good market to show our wares — is eliminated.

Limiting NCCs to Las Vegas, Chicago and Anaheim, Calif., limits the scope of the show. It is a fact that a show usually draws a majority of its attendees from a 300-mile radius, no matter what the show. We think that in eliminating Houston, Shugart is being a little shortsighted.

By the way, those of us attending NCC in Houston did not, for the most part, experience much of the hot, sultry weather referred to in the article; we were in an air-conditioned hall, air-conditioned buses or cabs, air-conditioned hotels, air-conditioned restaurants and so on. And, as a matter of fact, the evenings were quite pleasant.

What's more, the hot, sultry weather of Houston is no more or less of a discomfort than the snow, slush and freezing cold many of us as exhibitors run into at shows held in Chicago, Philadelphia, New York or Detroit in the winter. In fact, these latter conditions are even worse because many times they are responsible for closing an airport, thereby preventing potential attendees from coming to the show.

As for the claim that in Houston,

hotels were spread all over town — we have that in Anaheim. When NCC comes to Anaheim, companies sometimes have to book their people as far south as Newport Beach, Calif., and as far north as Los Angeles — a stretch of more than 80 miles. And I've been booked in hotels in Chicago and New York that were in questionable neighborhoods and unclear. These are problems that can be found in any large city.

The claim that the exhibit hall in Houston was in "grave disrepair" might be a bit exaggerated. I believe that if the American Federation of Information Processing Societies, Inc. (Afiaps) would voice such a concern to the convention center people, the problem might be remedied before 1984.

And what about the good points of Houston? We found the people in Houston to be very friendly. We did not have the labor union problems that we have had in other cities. Nor did we feel that we got ripped off in paying for hotels, meals or other items — something that we often feel in other cities.

Though we don't believe that this letter will change Afiaps' thinking, we do, at least, want to present the other point of view.

Houston, we'll be glad to attend any trade show located in your city.

Carol Felton  
Public Relations Manager  
California Computer Products, Inc.  
Anaheim, Calif.

## DATA PAST

### Five Years Ago Feb. 20, 1978

WALTHAM, Mass. — Honeywell Information Systems, Inc. announced four Level 6 minicomputers, two of which — the Model 53 and Model 47 — it aimed at the hearts of commercial users.

### Ten Years Ago Feb. 21, 1973

BOSTON — More than 300 products valued at over \$10 million and 18 workshops on installations provided the sparkle on the exposition floor as Computer Caravan/73 was launched here.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, Computerworld, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

LECHT ON SCIENCE / Charles P. Lecht

## Shattering the 'Information Bottleneck'

Let's grind our molars just a bit today and imagine that the infamous "information bottleneck" had truly been broken (or, if you prefer a less jagged metaphor, heroically dilated virtually to the vanishing point). Our Information Age has, in this hypothesis that verges so closely upon this morning's official truth, matured to the point where information flows into our lives with the same lack of human concern as electricity into our toaster ovens.

Friends, do you realize how difficult it is, in this best of all possible worlds, to claim ignorance as an excuse for either infirmity of purpose or outright error? Even granting that one has infinite access to information, a modicum of natural (as opposed to the vaunted artificial) intelligence is requisite for transforming it into knowledge is wanting.

Chances are that no adult version of finger-pointing will serve to exonerate us from the heartbreak and embarrassment of being publicly perceived as uninformed during the Information Age. Why, that would be like being without brass in the Age of Brass — worse, maybe. Not for us the disingenuous disclaimer of the unprepared junior high schooler that "my little brother ate my homework."

Just what can we say in our own defense? Ah, yes, we forgot to pay our telephone/cable/broadcast reception facilities bill and, so, were disconnected; or we took umbrage at the unconscionable size of that bill and are temporarily, but virtuously, standing on the world's most respected principle: that is, penury

*'Clearly, we'll have to shift some part of our attention away from the creation of more and more information and niftier and swifter means for its delivery. The overriding need will be to focus on the deeper challenge of forming more penetrating, meaningful questions.'*

(not poverty, which is a very different matter from and even more shameful than absentmindedness or sloth).

But almost certainly sooner rather than later, the Peripheral Papacy, unanimously supported by the counsel of the Cable Curia, will declare being uninformed the least sympathetic or pardonable of human sins.

Now that we have scared ourselves out of our wits with this nightmarish scenario, let us seek refuge in the bosom of the present.

### Information Age Is in Its Infancy

Obviously, nothing of what I have proposed thus far will be true as soon as tomorrow. The Information Age is in its infancy; not the faintest trace of sinister peach fuzz calls the smile upon its rosy lips into question, and the rigors of its adolescence are even more remote — as remote as the wicked witch of the west in the land of Micro-Oz. Just the same, you, too, were once a boy scout or girl scout and, baby, look at you now. Where there is no pressure — even tacit pressure — in the present, there is no future: So, to continue with our image, there is everything to recommend "being prepared" which, in

turn, bespeaks the underlying optimism that informs this article.

For one thing, your inability to afford all the high-tech instrumentation that would keep you perpetually on-line to monstrous data repositories and provide you with instant access to anything you might want to know and display (17 ways from Sunday including, perhaps, via direct infusion into the visual and other high-level cortical silver screens of your brain) won't render you obsolete as quickly as some suggest. Enough data can and will find its way to you at tolerable cost and keep you safe and warm and a part of the big picture.

But a new problem looms, beside which the challenge of popping out the other side of the information bottleneck looks positively trivial. I call it the "question bottleneck."

### The Question Bottleneck

Like the monsters that emerged from the id to annihilate the Krel, the question bottleneck is a creature of our own devising.

Until now, the principal virtue of the information bottleneck was that it provided camouflage for the uncouth legions of us who used it for

cover when we could not produce an answer. Some of us were even pleased to leave the impression that were it not for the intractable cork in our computer bottle, we would have been free to soar on the glistening wings of near infinite knowledge to unprecedented heights of performance.

Now fate, mediated by technology, is dealing us a deflating blow. We are becoming free not only to ask questions, but to obtain quick answers on practically any subject. Such "if only ..." pretensions that we clung to in order to explain away our occasional awkward silences must now be acknowledged for the intellectual window dressing they usually were.

In the good old, bad old days, we were prevented from asking more than a few stupid or irrelevant questions per day by the always accommodating information bottleneck. With this user-friendly obstacle removed, "right answers," like slaves in a Grade B movie, are set free to overwhelm us, no matter what the utility, superfluity or spaceyness of the questions.

Apart from providing each of us with his own copy of the emperor's new clothes, this torrent of unquality-controlled information could conceivably swamp even our serious efforts to improve anything at all. Yup, we're getting the information all right. And what's the message?: Simply that we haven't a clue what to do with it.

I do not here ignore the possibility that intelligently formulated and

(Continued on Page 30)

HUMAN CONNECTION / Jack Stone

## Improved College-Industry Relations Urged

According to three college seniors we talked with, computer science programs on campus need a lot of help.

We asked the youthful critics to come up with some practical ideas on how to improve matters, and we listened closely to their comments, hoping that their astute observations might awaken some concerns by industry leaders.

Pearl Marshall, a computer science major at a small private college, focused on the issue of vocational guidance.

"In my college, it seems that the data processing industry is in no way connected with the computer science program; I can't find anybody on the faculty or administrative staff who appears to know — or care about — what jobs might be available or what we have to do to qualify for them," she said. "If they do know, they certainly keep the information secret."

### Practical Program

"I'd think it would be very helpful if the industry representatives, at least those from local firms, would meet with members of our college administration to work out a practical

*This is the sixth article in a six-part series, "Computers and the Collegians," coauthored with Joanne Barker.*

communications program to help guide us in the planning of our computer careers," she said.

"The program could include such projects as a special bulletin board dedicated to displaying job openings, well-publicized presentations from industry specialists on what computer-related jobs involve, narrative write-ups on current jobs and recommended curriculum selections to meet particular job needs."

Bob Stewart, a philosophy major at a private college, was surprisingly practical in his approach to acquiring data processing experience.

"The idea of gaining a so-called 'computer education' in college is misplaced," he said. "The ability to understand the basics of computers in business is strictly a utilitarian function that involves skills that can be acquired in a specialized training facility like a trade school or junior college."

"My suggestion is that a college should consider a program much broader than we now have to deliver what students really need, and I agree with Pearl that industry representatives should participate in its development."

### Three Facets

"The program should have three facets: first, academically oriented courses in the computer sciences that cover the theories underlying the technology; second, applications-oriented courses to present the advanced notions of business data processing systems; and third, a mandatory work-study project whereby students receive data processing apprenticeships in industry to gain practical experience," he said.

"Of course, it would be nice if the students were paid a decent salary while in work-study, but if they get only minimum wage, that's OK, as long as academic credits are awarded."

Tony Charles, a business major at a large state-university, described the data processing services that are provided by the computer center at his university.

"I was pleased to take Introduction to Computers as an elective for my major, but my adviser never told me I'd have to wait in line two or three hours to get a keypunch and be restricted to 50 minutes hands-on after I arrived," he said.

### System 'Was a Joke'

"The university's batch system was a joke — eight keypunches for 40,000 students, with a one-day turnaround for job processing," he said. "I frequently had to plead with the teaching assistants to excuse the tardiness in delivering my programs because my job was stuck in an input queue."

"Sometimes the frustration was so intense that I wanted to drop the whole idea of a computer career at times, and many of my friends felt the same way. If the department was really trying to excite us, its efforts were subverted by the computer center."

"I suggest that industry DP managers — assuming they know what they are doing — come to campus to help straighten out the center's mess before all the students are turned away from computer careers."

## A Limited Picture

In "Consultant Sees DP Mystique Disappearing" [CW, Dec. 6], consultant Chuck Tesler presented a limited picture of microcomputers and the responsibilities of most data processing departments.

The microcomputer is a very powerful tool and, if used properly, can play a significant role in improving DP capability and personnel productivity.

In addition to this, Tesler's comment about comparing

IBM 3081 response time with a micro's was without regard to what jobs were being done on the two types of systems in question.

Some significant points were missed in the article. First, in order to make the microcomputer most productive, the microcomputer itself should be supplied with the proper data, which will be used in conjunction with the

various spreadsheet or analysis programs that are available.

The data should be supplied through communications with a mainframe. Properly supplied with data, the microcomputer can be a powerful analysis tool and can be used to offset or take the burden off the mainframe.

But the data base that it is

supplied with is important, and how the data base is supplied can, if not handled properly, be very expensive to a business.

Second, any person who has been in the DP field for some time realizes that, in terms of efficiency, it is best to get the most user involvement possible in any application. Microcomputers, to the extent that they can assume

more of the data processing burden, go a step beyond interactive or on-line applications in providing user involvement.

From an administrative point of view, Tesler stressed the low cost of the microcomputer. This is, I agree, an attractive feature.

Another thing to be considered is the education of users. It can be very expensive if a user is not educated and, in effect, chooses to educate himself on company time.

Maintaining the integrity of the total system is where our responsibilities lie today. And we must remember it is not the case that everything printed on computer paper is gospel.

Ed Becker  
Vice-President  
Information Services  
Medline Industries, Inc.  
Northbrook, Ill.

# LETTERS

## SCIENCE/SCOPE

Fusion energy machines that would turn sea water into electricity, though still 20 years away, are a step closer to fulfilling their promise of satisfying much of the world's energy needs. In plasma-heating experiments, Hughes Aircraft Company researchers have demonstrated a gyrotron with the highest performance yet reported. It produced 285 kilowatts at 60 gigahertz at 45% efficiency under pulsed conditions. The short-range goal of this research program is to generate 200 KW at 60 GHz with long pulses in excess of 100 milliseconds. The long-range goal is to generate 1 megawatt at 100 GHz. The Oak Ridge National Laboratory sponsors the program for the U.S. Department of Energy.

Technologies of laser holography and diffraction optics have led to an experimental visor for protecting military pilots from potentially blinding laser beams. The visor reflects light at wavelengths used for lasers without significantly reducing visibility. It would replace devices employing dyes, which produce distracting discolorations, absorb light, and cut visibility. Designed by Hughes for the U.S. Navy, the visor could be adapted for ground troops.

An Advanced Medium-Range Air-to-Air Missile has intercepted a drone target, showing its ability to find low-flying targets amid high clutter caused by the missile's radar returns reflecting from the ground. The prototype AMRAAM was fired from an F-15 fighter from an altitude of 16,000 feet and a range of about 13 miles. The remotely controlled target flew toward the F-15 only 400 feet above the ground and operated an electronic countermeasures pod in an effort to jam the missile's seeker. Hughes is producing AMRAAM under a full-scale development contract for the U.S. Air Force and Navy.

A cleanroom believed to be the world's largest serves as the birthplace for such military electro-optical devices as laser rangefinders, laser designators, and infrared night vision systems. The new Hughes complex spans 60,000 square feet. It is environmentally controlled to be free of contaminants because even one particle of dirt barely visible to the naked eye could ruin sensitive optics. Although the electro-optical components themselves are delicate and require meticulous assembly, a completed device is hermetically sealed and built to withstand rugged use in the field.

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## Getting Information

(Continued from Page 29)  
precisely expressed questions producing the irreducibly "correct" answers will, from time to time, yield useful and exciting results. But there is nothing in this view to lead us to expect the actual percentage of such questions to increase, whatever the speed of the answers they elicit. Clearly, we'll have to shift some part of our attention away from the creation of more and more information and niftier and swifter means for its delivery. The overriding need will be to focus on the challenge of forming more penetrating, meaningful questions.

This new emphasis may yet rescue us from the onslaught of mindless, machine-reliant ingenuity that has, as an unexpected by-product, eroded our motivation to consider just what it is we want to know and precisely why. Once this is done, the Information Age, successor to the Age of Innocence, progenitor of the Question Age, will stand in the history of our species as a second Age of Gold.

Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

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## Midstream Switch From Cobol Insurer Navigates Language Change

BALTIMORE — Is it possible for a Cobol-based DP department to change, midstream, to another programming language?

Apparently Blue Cross of Maryland thinks so. This organization has adopted Pro/Grammar, an applications development and information retrieval package from Pansophic Systems, Inc., an Oak Brook, Ill., firm.

"Pro/Grammar has been decreed an official programming language now," Bill Lumpkin, manager of training and senior systems programmer for Blue Cross of Maryland, explained.

"People are encouraged to put Pro/Grammar into production," he continued. "It will be used for all report-type work, and we expect Pro/Grammar to be used for low complexity data extraction and file manipulation. It will also be used for reformatting, reorganization, test data development and/or extraction."

Prior to the introduction of Pro/Grammar, Cobol was the only official programming language at the firm, which is a medical insurance company that serves the state of Maryland. There are approximately 175 people in the data processing department of Blue Cross of Maryland

and, of these, 80 comprise the applications programming staff. A second programming staff of 25 people handles government systems. A computer center consisting of an IBM 3033 running under MVS with TSO, and CICS with IMS, is shared with Blue Shield of Maryland.

The Blue Cross programming personnel

will be trained in Pro/Grammar via a training course developed in-house, which runs from simple report generation to complex file matching. "All of the non-EDP users (financial underwriting) who currently have access to TSO will be trained in Pro/Grammar," Lumpkin said.

(Continued on Page 36)

## IBM VM/SP System Program Adds Resource Management

RIDGEFIELD, Conn. — Adesse Corp. has announced the availability of a programming extension to the IBM VM/SP System Control Program.

The VM/SP System Resource Manager (SRM) is a three-level, hierarchically structured programming extension of the IBM VM/SP System Control Program. The SRM's function is to make decisions regarding the allocation of the resources of a real computing system that executes VM/SP.

The system establishes and enforces installation policy regarding the priority of resource allocation and, therefore, con-

trolling relative user performance, the vendor stated. The System Resource Manager also provides favored virtual supervisor support, which permits a virtual machine that alters its resource needs and associated performance profile to be favored without causing some of the more undesirable effects of standard favoring facilities.

SRM is offered with a per-CPU license for a monthly charge of \$3,000, which includes maintenance. The purchase price for SRM is \$60,000 per CPU, according to the vendor.

Adesse can be contacted through P.O. Box 515, Ridgefield, Conn. 06877.

## MSA's 'Cets' Tailored for IBM

ATLANTA — Management Science America, Inc. (MSA) has unveiled the Capital Expenditure Tracking System (Cets), which was designed to operate independently or integrate with MSA's Fixed Assets Accounting System (Faas.)

Cets runs on IBM and plug-compatible 370, 30 series and 4300 systems under DOS/VS(E), OS/VS1 and OS/VS2. It is intended to provide information on current and anticipated expenditures by identifying potential problem areas before they lead to overexpenditures or overcommitments, the vendor noted.

Its project tracking features include comparing and reporting actual and budgeted amounts, calculating estimated completion costs, flagging cost overruns throughout the project, forecasting future project payments, reporting interest expenses by project and provid-

ing control by identifying such costs as property units, indirect charges, fees and permits, freight, taxes and interest. The software reportedly compares percent of completion by actual expenditures vs. appraisal, tracks quantities by purchase order and invoice, provides material reporting including quantity received and determines the cost basis for book and tax accounting.

Reports produced by Cets include completion cost estimate, project status report, project commitment analysis, project variance report, projected payments report, actual payments report and inventory list.

Cets is priced between \$20,000 and \$30,000, depending on the configuration and options selected, the vendor said from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

## 'V/Quick' Slashes Response Time

ARLINGTON, Va. — VM Systems Group, Inc. has announced V/Quick, a program that reportedly cuts response time in IBM VM/CMS environments by as much as 50%.

The package reportedly speeds up paging for the interactive user. It is said to have the most dramatic effect on heavily loaded configurations with paging on moving head disk drives, the vendor said.

The package is a modification to IBM's VM/SP operating system. It affects five command program modules and adds one additional module. The package is available for releases 1.0 and 1.1 of VM/SP. The package costs \$4,990, and installation takes about eight programming hours. Source code and updates are furnished, the vendor said from Suite 14, 3123 N. Military Road, Arlington, Va. 22207.

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## For IBM DOS Systems

### 'File-Aid,' 'Abend-Aid' Out

BIRMINGHAM, Mich. — Compuware Corp. has announced two new software tools for IBM DOS systems.

File-Aid is a multifunction, parameter-driven product that consolidates the most commonly used IBM utility functions, a spokeswoman said. Available in both batch and Structured Programming Facility (SPF) versions, the package allows for allocation, browsing, updating and manipulation of data files, regardless of the file organization, access method or storage medium.

Under SPF, the utility supports all access methods without using the Idcams utility. Users can print, browse or dump records in character and

hexadecimal format selectively, according to the vendor.

File-Aid allows JCL partitioned data sets to be handled logically. Interactive capabilities extend the power of SPF, allowing data sets to be searched and updated through any access method. The price range is from \$7,200 to \$15,100 for SPF and from \$5,200 to \$10,800 for batch, depending on options.

The company's Abend-Aid diagnostic package has been expanded to include DOS DL/1, the spokeswoman said.

The major category of errors analyzed by the latest release is for DL/1 system error messages. Abend-Aid is said to determine the exact reason for the problem. The tool also reportedly identifies the status of the data base, formatted contents of each current segment involved with the error and results of the last eight calls to the data base.

Prices range from \$6,500 to \$12,500 for OS, \$3,800 to \$6,500 for DOS and \$5,300 to \$8,200 for DOS DL/1, depending on CPU type. Both products are available from 32100 Telegraph Road, Birmingham, Mich. 48010.

## IBM MVS Users Get JCL System

HERNDON, Va. — Software Corp. of America has unveiled a system said to allow IBM MVS users to catalog, maintain and execute JCL from their own private procedure libraries (Proclib).

Easyproclib reportedly allows an unlimited number of Proclibs to be established. Private procedure libraries can be developed for each department, production application, development group, programmer or major job.

The software was designed for large IBM computers operating under any release of OS. A 30-day trial period is available for the \$6,000 package, which comes with one year of free maintenance, according to the vendor. Software Corp. of America is located at 455-A Carlisle Drive, Herndon, Va. 22070.

## Schedule System Fits IBM's VM

FALLS CHURCH, Va. — VM Software, Inc. has announced VMDefer, a schedule system for IBM's VM that is said to offer security features, management reports and a central data base of all events scheduled.

A vendor spokesman said VMDefer reduces prime-time loading by allowing users to schedule routine tasks and programs during off-peak time. VMDefer also includes resource limiting facilities that allow it to be substituted for CMS batch processing.

A permanent license fee costs \$2,500 from VM Software at 7777 Leesburg Pike, Falls Church, Va. 22043.

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The Seybold Report on Office Automation; and John Walsh, Communications director of Avon Products, Inc.

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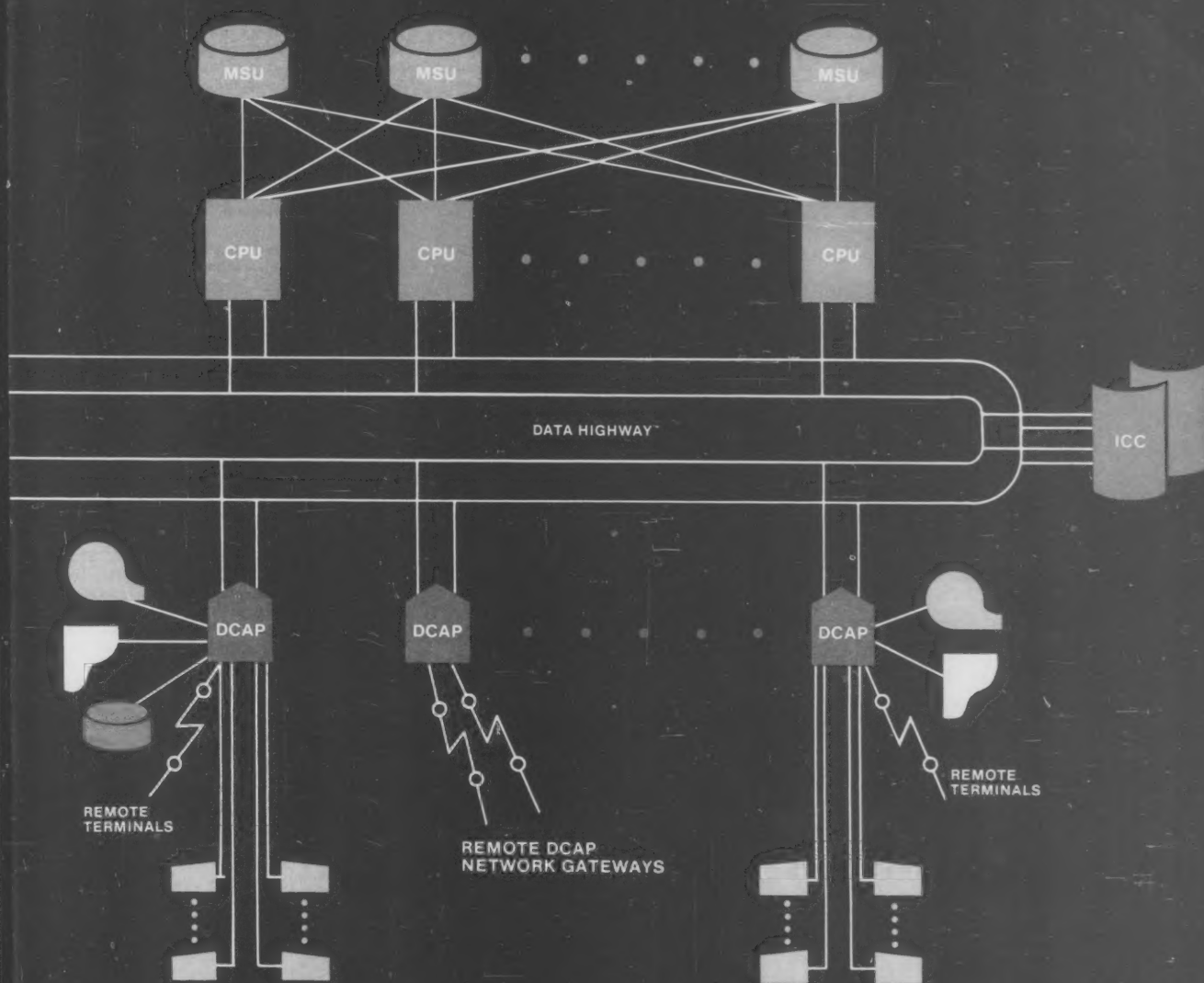
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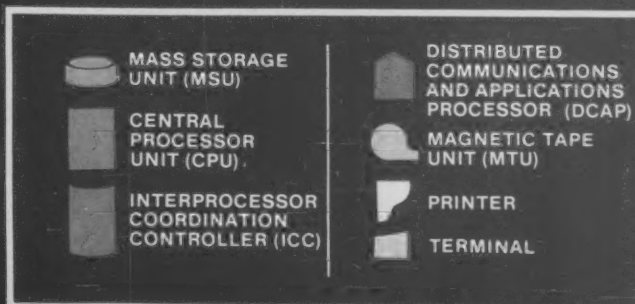
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# Gould Unix-Related Ada, Pascal Compiler Out

FORT LAUDERDALE, Fla. — Gould, Inc.'s SEL Computer Systems Division has announced two Bell Laboratories Unix-related software products for the Gould Concept/32 family of 32-bit computers. The Ada and Pascal products are said to be the first in a series of products committed to the Unix environment.

The Gould implementation of the Ada compiler

translates a comprehensive subset of the Ada language. The Pascal compiler, which also runs under Gould's authorized version of Unix, is said to be compliant with international standards. Both compilers generate machine code via the C compiler for the Concept/32 family of computers. Object programs can execute at raw machine speeds and Ada, Pascal and C subprograms can be mixed

together, the vendor said.

Usage charges for the Ada and Pascal compilers are

\$10,000 and \$6,000, respectively, under a licensing agreement from Gould SEL,

located at 6901 W. Sunrise Blvd., P.O. Box 9148, Fort Lauderdale, Fla. 33310.

## Md. Insurer Switches Languages

(Continued from Page 31)  
"In addition to giving them the language training, we anticipate the development of some menu screens under CICS, where the user would be able to select options or

fill in the blanks. Pro/Grammar is structured and syntactically organized, and we feel it should be fairly easy to do this."

The main benefit of Pro/Grammar, according to

Lumpkin, is "its ease of coding. It is many times easier to code in than Cobol."

"In the future, Pro/Grammar will become an integral part of our production language, so that significant portions of any system could be written in Pro/Grammar as opposed to Cobol," he said. "One of the things that we like best about Pro/Grammar is that you only have to specify the working fields that you want."

The Pro/Grammar training course at Blue Cross of Maryland runs two hours per day, spread over two weeks. Each session assigns "homework," building upon the previous assignment. The training varies, depending on the knowledge/experience level of the attendees, Lumpkin said. "We have a two or three day add-on to cover more sophisticated users. Once we have run our class by about 40 to 50 people, we hope to convert it from a stand-up instruction to a computer-based interactive training system. This will provide step-by-step instruction for new users. I see this as an opportunity to provide Pro/Grammar training for new people without using instructors for just one or two people, especially since people at the same position level often work at different speeds."

The general feeling at Blue Cross of Maryland is that the use of the new Cobol alternative will help deal with the backlog of user requests to DP. "We believe that users will now be able to handle a number of their own requests," Lumpkin said. He added that the product should save time. "We feel that it will enable a programmer to ask himself 'What if?' and dash out a quick program."



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## CA-Raps Release 2.0 Allows Access to Power/VS(E) Files

JERICHO, N.Y. — Computer Associates has announced Release 2.0 of CA-Raps, an IBM DOS/VS(E) product that reportedly allows access to Power/VS(E) spool files from 3270-type terminals or printers operating under CICS/VS.

The product supports IBM's 6670 printer including operator command language and offers a job accounting interface. CA-Raps utilizes remote printers to deliver information on-line, a spokesman said. Increased security features in Release 2.0 are provided through an expanded

command table, report distribution utilities and enhanced screen formats.

The command table allows authorized lists of commands, user-level key/command assignment, definition of command synonyms and command user-exit routines. Report distribution makes it possible to separate and regroup reports without the need to change the original program. Report sharing allows a report to be printed at multiple CICS/VS printers concurrently, the company claimed.

CA-Raps costs \$4,100 for a three-year lease from 125 Jericho Tnpx, Jericho, N.Y. 11753.

## Monitor Targets DEC, IBM CPUs

PALO ALTO, Calif. — Xidac Inc. has introduced a performance monitor said to allow users of the vendor's portable Mainsail programming environment to identify and monitor code areas. Among the machines it will run on is the Digital Equipment Corp. VAX-11/780 and the IBM 4331.

MainPM reports the amount of time a module or procedure is active, the time spent within each module or procedure, the various statements executed in each module or procedure and the number of times each statement in a module is executed. The program also allows users to see an unexecuted program's procedures or statements.

The package is available for the 4331 or the VAX-11 for \$4,000 from Xidac, Inc., Suite 101, 530 Oak Grove Ave., Menlo Park, Calif. 94025.

## ESP Announces Control System

ARMONK, N.Y. — Exact Systems and Programming Corp. (ESP) has unveiled an Information Management Control System (IMCS) said to provide performance enhancements in three major areas: application development, computer resource utilization and systems responsiveness.

DNA-4 IMCS was designed to operate in standard releases of Data General Corp. AOS, AOS/VS and Rdos operating systems and Rolm Corp.'s RMX-Rdos.

An automated program technology is included in DNA-4.

The resources of the system are managed by a data base management system, which is an integral part of DNA-4. Some of the features are a data dictionary facility, an audit trail, data compression and decompression, up to 32 index/file; concatenation of fields in an index to perform an on-line sort and automatic reutilization of released storage space.

DNA-4 IMCS is licensed for use on specific DG and Rolm computers and may be copied only for backup purposes. The license fee for DNA-4 ranges from \$4,400 for a DG Micro-eclipse S-20 to \$50,000 for a DG MV-8000. Monthly rentals range from \$750 to \$2,750. A software subscription service is also offered.

ESP is located at 1 Labriola Court, Armonk, N.Y. 10504.

## TP-270 NETWORK ANALYZER

The TP-270 provides a simple, easy-to-use method of determining network response time and the individual delays that contribute to response time. The device also provides a means of directly measuring the effects of software or hardware changes on the network performance.



### FEATURES

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### VMTAPE

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- Provides flexible control by managing any number of tape volume series and tape drives
- Supports SL tape usage
- Eliminates operator tasks other than the physical volume mount
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### VMLIB

- VM Library Control System allowing users to share source code without duplication
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- Interface to DOS and OS systems
- Provides control and security by user, by program, and by function

### VMSECURE

- Comprehensive security for the VM environment
- Permits encryption of data with no source code changes
- Simple end user command language
- Allows user to administer security

### VMDEFER

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- Allows load balancing of CPU by permitting events to be run in off prime
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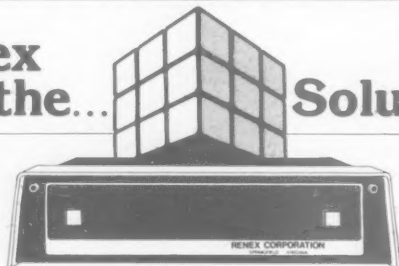
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## Handles Vsam, Isam Records

# CICS File Utility Announced

FAIR GROVE, Mo. — MacKinney Systems has announced CICS On Line File Utility, a product that reportedly allows programmers to look up any record of any Isam or Vsam file that is defined to IBM's CICS.

The record displayed in character and hexadecimal form may be updated or deleted, a vendor spokesman said. New records may be added and files may be browsed forward or (Vsam only) backward.

The package will also scan a file searching for a record that matches a user-entered value. Security checks may be customized at installation to limit access to certain files.

The package is designed for checking test results, creating test input, correcting errors on files and troubleshooting, the spokesman said. The utility runs on any IBM or plug-compatible system supporting CICS

and costs \$695 or \$295/year. The company can be contacted at Rt. 2, Box 270A, Fair Grove, Mo. 65648.

## Version 5.0 Of 'Libxref' Out

WEST HARTFORD, Conn. — Multitask, Inc. has announced the release of Version 5.0 of Libxref, its cross-reference and documentation package for IBM and plug-compatible mainframes.

Version 5 of Libxref reportedly includes features that supplement data dictionaries by populating them automatically. Libxref can be used without a data dictionary to show automatically where all components in a system are used and referenced. This includes Cobol, JCL, PL/I and IBM IMS items.

The vendor also noted that the price of Libxref has been reduced. The product now is available on a permanent lease with full support for \$1,999. Multitask is located at 1007 Farmington Ave., West Hartford, Conn. 06107.

## Interface Links SPSS System With VAX-11

MARLBORO, Mass. — Digital Equipment Corp. and SPSS, Inc. have announced a software interface that links SPSS' Statistical Package for the Social Sciences (SPSS) Batch System with DEC's VAX-11 Datatrieve high-level data manipulation facility.

The SPSS Batch System is a tool for information analysis, summarization and display that is said to offer more than 40 procedures from simple table construction to multivariate statistical analysis. Datatrieve allows password protection for SPSS data files, a DEC spokesman said.

SPSS/VAX users can pass data through the interface from the VAX-11 DBMS data base management system or from VAX-11 record management system (RMS) record files to SPSS, SPSS Graphics and the SPSS Conversational Statistical System (SCSS).

SPSS can also pass descriptions of VAX-11 DBMS and RMS data, stored in the VAX-11 Common Data Dictionary, to SCSS and SPSS graphics, the spokesman said.

The interface costs \$4,000 directly from SPSS, 444 N. Michigan Ave., Chicago, Ill. 60611.

## T/S Offering Targets Banks

GREENWICH, Conn. — Control Data Corp. has announced the availability of a short-term money market function on its Business Information Services time-sharing system.

X/Issue is oriented toward financial institutions and corporations that issue certificates of deposit or commercial paper, a spokesman said. The offering can be geared toward each firm's requirements and can handle new instrument types, including periodic payment notes and variable rate notes. It provides for inputting, calculation, printing, revaluation, prepaying, voiding and tracking of a note portfolio.

Costs vary depending upon CPU usage, storage requirements and output with a minimum monthly charge of \$200, a spokesman said from 500 W. Putnam Ave., Greenwich, Conn. 06830.

## Eclipse Users Get Basic Compiler

BOWLING GREEN, Ohio — Dacor Computer Systems has introduced Ebasic, an interactive compiler for Data General Corp.'s Extended Basic running on Eclipse computers under AOS and AOS/VS.

The package is said to generate compact code that is fully compatible with Extended Basic programs already in use as well as with Cobol, PL/I and Fortran file formats. The compiler modifies, compiles and runs the program under development and checks for syntax errors. The run-time support module allows applications to be designed so that a user logs directly into an application program without using the compiler.

Ebasic incorporates five interchangeable numeric data types in-

cluding two- and four-work floating point values and one-, two- and three-word integer values. Structured programming constructs include "if ... then," "while ... end-while" and "if ... do ... else ... end-if" and supports full Boolean expressions in all forms of "if" and "while" statements.

A screen editor permits interactive definition of a screen using the terminal as a layout sheet together with a screen compiler. An Isam file access method provides support for duplicate and generic keys together with utilities to create, reorganize and access indexed files.

Ebasic costs \$6,400 through P.O. Box 366, 13330 Bishop Road, Bowling Green, Ohio.

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## Micro Notes

Overbeek Enterprises has announced a full-screen text editor called **Disk Inspector**. Although it runs on a Zilog, Inc. Z80-based microprocessor under Digital Research, Inc.'s CP/M operating system, users can inspect, alter, recover and read Apple Computer, Inc. Apple II diskettes as well. It costs \$29.95 from the vendor through P.O. Box 726, Elgin, Ill. 60120.

Data Associates has unveiled **Compare/C32**, a utility that compares different versions of Basic programs on disks for personal computers and provides a paged printout of differences. It runs on Radio Shack TRS-80 Model I and III microcomputers. Compare/C32 costs \$24.95, in-

cluding operating manual, and is guaranteed to load and run. More information is available from the vendor through P.O. Box 882, Framingham, Mass. 01701.

Residential Energy Analysis announced **On-Line Plotting Utility System (Opus)**, an Apple Computer, Inc. Apple II package said to emulate Tektronix, Inc. remote graphics terminals. Opus was designed to execute on a 48K-byte Apple II or Apple II Plus with at least one disk drive and a Hayes Microcomputer Products, Inc. Micro-computer II. The system costs \$200 from the vendor at 864 Eisenhower Drive, Pittsburgh, Pa. 15228.

Microsoft, Inc. has announced the release of the **Business Basic Compiler** for Intel Corp.'s 16-bit 8086 and 8088 microprocessors running under the MS-DOS operating system. It costs \$600 from Microsoft at 10700 Northrup St., Bellevue, Wash. 98004.

RR Software has announced the release of a new version of its **Janus/Ada compiler** said to be a scaled-down demonstration version designed to exemplify the features of the full Janus/Ada package. It is available for disk formats such as Digital Research, Inc.'s 8-in. CP/M-80 and CP/M-86, IBM's Personal Computer PC-DOS and PC-CP/M-86, Apple Computer, Inc.'s Apple II Softcard and MD-DOS. The demonstration version costs \$30 from RR Software, P.O. Box 1512, Madison, Wis. 53701.

PC Goodie Co. has introduced the **Label Kit PC Disk Organizer** for the IBM Personal Computer. It prints alphabetized labels which are placed on a disk and works with any tractor-feed or letter-quality printer such as those from IBM, Qume Corp., NEC Corp. and Epson America, Inc. It is available for \$59.95 plus shipping and handling from the vendor at Suite 10, 15445 Ventura Blvd., Sherman Oaks, Calif. 91413.

Solid Software, Inc. has announced an enhanced version of its **Commercial Property Management** package for users of Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS operating systems. Designed for use by landlords and property managers who own multiple properties, the package costs \$1,495. The vendor is located at Suite 501, 5500 Interstate N. Pkwy., Atlanta, Ga. 30328.

A Visicorp Visicalc expansion package for Apple Computer, Inc. Apple II users is available from U-Microcomputers, Inc.

The **Visicalc Expand Gold Pack (VEGP)** reportedly expands the Apple II's display from 40 col. by 24 lines to 80 col. by 24 lines and its memory from 35K bytes to 145K bytes. The 80-col. card in VEGP is said to be fully compatible with IBM DOS 3.3, Digital Research, Inc. CP/M and UCSD Pascal.

VEGP with 128K bytes costs \$720 from the vendor at 300 Broad St., Stamford, Conn. 06901.

Science Management Corp. (SMC) has announced its **Multiuser Basic Operating System (M-BOS)**, for 16-bit microcom-

puters by Seiko Instrument, U.S.A., Inc., Dynabyte, Inc. and Micro-Five Corp. M-BOS includes the company's Basic programming language and is compatible with SMC Uni-Dol, a version of Bell Laboratories' Unix System III. The package supports up to 16 users and is compatible with SMC's Idol data base management system, a spokeswoman said. The price range is from \$395 to \$795 through P.O. Box 6800, 1011 Rt. 22, Bridgewater, N.J. 08807.

Three programs for use with the Profile Plus electronic filing program for the TRS-80 Model II microcomputer were introduced by Radio Shack. **Profile Prosort**, available for \$149, was

described by the vendor as a high-speed indexing program that permits sorting and selecting records from any segment of a file. **Profile Forms**, a print program that prints one report per sheet on each item in the file, is priced at \$125. **Profile Archive**, which allows the user to purge inactive records from any file in Profile Plus, is available for \$49. The vendor is located at 1800 One Tandy Center, Fort Worth, Texas 76102.

Gemini Information Systems, Inc. has announced a data base management system for the IBM Personal Computer. The price of **DDQuery** starts at \$7,500 from the firm at 5500 S. Syracuse Circle, Englewood, Colo. 80111.

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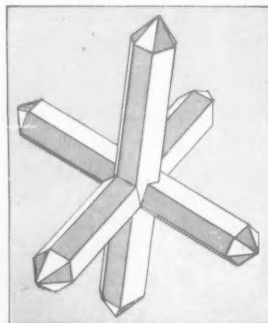
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## From Five Case Studies

# Report Reveals Solutions to Net Problems

By Bruce Hoard  
CW Staff

FRAMINGHAM, Mass. — A recent report from International Data Corp. (IDC) titled "Case Studies in Network Implementation" reveals how five large corporations solved their communications networking problems.

Midland Oil and Gas Corp. formed the Committee for Office Planning and Review (Copar) in 1979 after it realized the potential for substantial productivity gains through office automation, the report noted. The committee had representatives from corporate headquarters as well as major divisions.

Copar clamped a nine-month embargo on office automation purchases, developed a statement of corporate policy covering the acquisition and retention of equipment and set a corporate goal of compatible and integrated sets of office

automation equipment and systems, with an eye toward developing a corporatewide communications network.

After thorough investigation, Midland selected Xerox Corp.'s Ethernet for its corporate networking scheme. Midland felt Ethernet had distinct advantages as a networking scheme and that Xerox was committed to the kind of enhanced information handling functionality it would need for future applications.

The U.S. House of Representatives' Committee on House Administration is currently implementing a broadband local-area network to support data and voice

traffic of the House of Representatives Network, the IDC study said.

"House Information Systems began installation of the cable systems almost three years ago and this effort is still underway," it stated, adding, "The cable runs throughout six buildings located in approximately a one-mile radius on Capitol Hill."

The House is presently reaching the completion of Version 1A of its three-phase implementation procedure. Version 1A has a local-area network in operation to which are connected the House's Amdahl

(Continued on Page 42)

## Communications Products Series Announced by Tri-Data Corp.

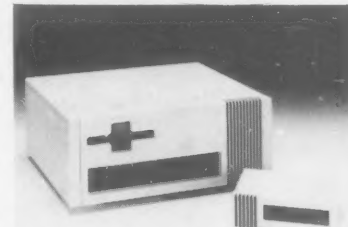
MOUNTAIN VIEW, Calif. — Tri-Data Corp. has introduced a family of communications products that can be configured as a multiplexer, data concentrator, protocol converter, cluster controller, packet processor and nodal processor.

The products reportedly allow dissimilar hosts and workstations to work in the same network regardless of the local or remote protocols employed. Any RS-232/RS-422-compatible workstation devices are supported, including personal computers and teleprinters, a vendor spokesman claimed.

The Netway 200 communications processor provides remote and local networking facilities for up to 32 workstations and/or host ports. The Netway 50 local network interface connects a local network to a Netway 200 processor up to two miles away.

The Netway 100 device interface processor provides terminal emulation and presentation services and is down-line loaded from the processor. The Netway 150 is a network interface processor that acts as a remote connection for a local network.

The communications operating system, Ncos, provides workstation and host transparency and allows multiple host protocols to run concurrently. An interface allows Digital Research, Inc.'s CP/M operating system to run as a task for application development. The Nnet networking software is said to provide automatic alternate routing, on-line configuration from any workstation and network management with up to 254 Model 200 processors.



Netway Links Dissimilar Devices

The series of products together provide such protocols as Ascii start/stop, IBM 3270 Binary Synchronous Communications, IBM 3270 Synchronous Data Link Control (SDLC), IBM Systems Network Architecture/SDLC, Burroughs Corp. Poll/Select and X.25, according to the vendor.

The communications processor is available for \$6,880, the local network interface for \$200, the device interface processor for \$420, the network interface processor for \$420 and Nnet for a single-user license fee of \$500.

Shipments will begin in the second quarter of 1983 from Tri-Data, which is located at 505 E. Middlefield Road, Mountain View, Calif. 94043.

## Terminal Manager Out for VAX-11

MAYNARD, Mass. — Digital Equipment Corp. has introduced terminal data management software said to reduce development and maintenance costs for interactive applications that use screen-displayed forms to guide data entry and inquiry.

The VAX-11 Terminal Data Management System replaces portions of the application programs with program-independent definitions for screen formats and application program/data mapping, a vendor spokesman said.

The software is intended for DEC VAX computer systems running interactive, terminal-based applications ranging from data base inquiry/response/update tasks to real-time uses such as monitoring the output of an industrial process.

The package will be available in April for a single-use license fee of \$5,000 from DEC, which is located at 146 Main St., Maynard, Mass. 01754.

## Graphics Terminal 4010-Compatible



GVT Graphics Display Terminal

PHILADELPHIA — Human Designed Systems, Inc. has introduced an interactive graphics display terminal said to be compatible with the Tektronix, Inc. 4010 graphics terminal.

The GVT Graphics Display Terminal offers vector and character erasure or write-over, block fill, memory dump and load, dotted and dashed lines and graphics memory dim. The terminal combines Ansi X3.64 functionality, Digital Equipment Corp. software compatibility and switchable 80/132 col. capability, a vendor spokesman said.

The terminal is available with eight pages of memory for \$2,045 and with four pages for \$1,895 from 3440 Market St., Philadelphia, Pa. 19104.

## Broadband Optic System Bows

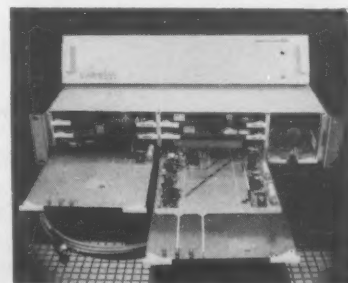
GRASS VALLEY, Calif. — The Grass Valley Group, Inc. has introduced a broadband fiber-optic communications system said to handle single channels of data and video information.

Wavelink Model 3291 transmits analog signals over a distance of 2 kilometers using an LED source and an FM transmission method rather than AM. The FM method operates with an on/off action of the transmitting device.

The systems can transmit a single channel of data between 20K bit/sec and 50K bit/sec depending on the proximity of the terminal to the system, a vendor spokesman said.

Wavelink's transmitter and receiver are available for \$11,000 each from The Grass Valley Group, Inc., which can be reached

through P.O. Box 1114, Grass Valley, Calif. 95945.



Wavelink Model 3291

COMMUNICATIONS

## Interface Links TI Micro to Net

SAN JOSE, Calif. — Corvus Systems, Inc. has introduced an interface said to allow the newly introduced Texas Instruments, Inc. Professional Computer to connect to a Corvus Omninet local-area network.

The transporter card interface will allow users to share peripherals such as mass storage devices and printers

and will offer interactive communications and connections to as many as 63 other microcomputers or peripheral devices, a vendor spokesman claimed. Omninet is a carrier-sense multiple-access local-area network.

The interface is available for \$495 from Corvus Systems, Inc., 2029 O'Toole Ave., San Jose, Calif. 95131.

## Report Reveals How Firms Solved Network Problems

(Continued from Page 41)

Corp. computers and 31 asynchronous terminals. Over 150 users are expected to be on-line within a year.

Last year, M/A-Com, Inc. installed a \$500,000 proprietary satellite communications system that is expected to provide the company with an effective management tool for the coordination of engineering, manufacturing, financial systems, marketing and research and development among the various M/A-Com operating companies.

The Macomnet system will be used for video teleconferencing, voice communications, distributed data processing (DDP), electronic mail and document distribution. At present in phase one, the network allows asynchronous communications for 30 user devices. Phase Two is expected to see that figure rise to 200.

Champion International Corp. is a Fortune 100 forest products firm, which, according to the IDC study, has implemented "a more or less straightforward [DDP] star network."

The network allows Champion to centralize corporate accounting, financial and reporting processes while giving remote sites the computational power to process orders and invoices while keeping tabs on shipping and inventory.

The IBM 3033- and 3031-based system employs an NCR Comten, Inc. 3690 data switching system with a disk as a "large mailbox" for communications between the mainframes and 160 IBM Series/1s located at remote sites.

"Rather than let the structure of the distributed processing network dictate management structure, Champion has instead attempted to integrate the processing functions into the organization," the report observed.

In so doing, it added field support services to the management information systems group. The end result was that the field service group is now able to maintain control of most of the distributed network.

Fireman's Fund Insurance Co. has three IBM 3081 mainframes and a large Systems Network Architecture network of 8100s to support over 50 branch offices and 15,000 independent insurance agents.

Fireman's Fund's migration to DDP followed what the report termed "a relatively typical" path. Starting from a highly centralized DP environment, the company installed terminals followed by mini-computers at its branch offices.

Despite some difficulties, the firm is happy with its 8100s and is planning to install about eight more each

month, the 51-page report said.

"Case Studies in Network Implementation" is available for \$4,500 from IDC at Five Speen St., Framingham, Mass. 01701.

## With Cursor-Addressing Protocols

## Displayphone Enhanced

MINNEAPOLIS — Northern Telecom, Inc. has added a feature enhancement to its Displayphone integrated voice and data terminal.

The Displayphone will now include two user-selectable cursor addressing protocols, according to a spokesman for the vendor.

This is said to allow the product to access more sophisticated computer programs. It will also allow the terminal to be partially compatible with the IBM 3101 terminal, the spokesman said.

The enhancement is incorporated into the terminal's software, according to the spokesman.

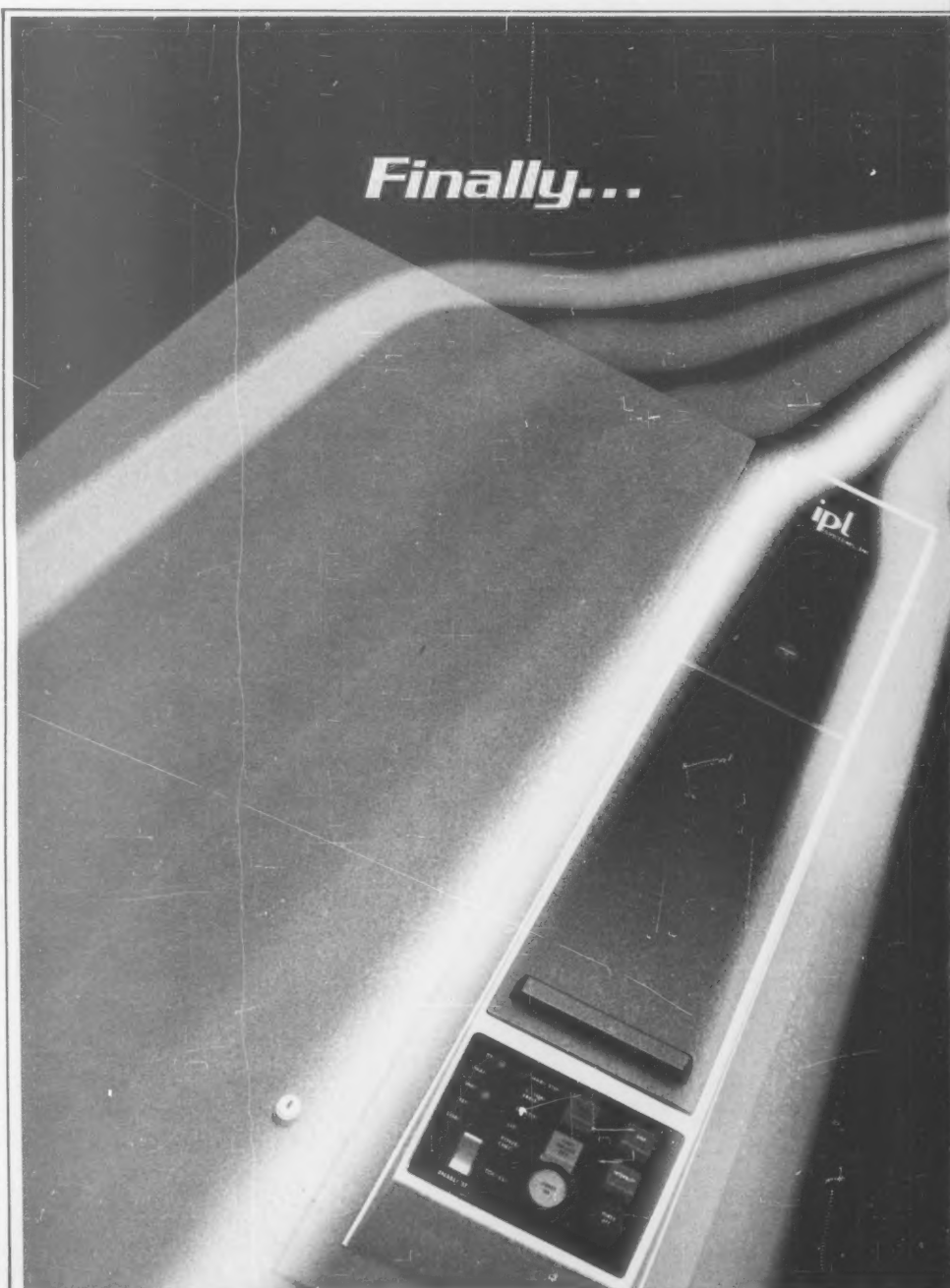
Displayphone sells for \$1,595 from Northern Telecom, Inc., Data

Park, P.O. Box 1222, Minneapolis, Minn. 55440.

## Datcom Modems Get \$200 Price Cuts

CHAPEL HILL, N.C. — Datcom, Inc. has announced a \$200 price reduction on two of its top-of-the-line Bell Laboratories 212A-compatible modems, effective March 1.

The new price of the Datcom 212 is \$595, which includes features such as built-in "A" control, seven diagnostic tests and front panel voice/data control. Datcom's 212 modem with automatic calling unit is now priced at \$695 from Suite 116, 200 Eastowne Drive, Chapel Hill, N.C. 27514.



## Message Switching Unveiled

ST. LOUIS — McDonnell Douglas Automation Co. has introduced a rapid message switching package that integrates applications that run under IBM's IMS DB/DC data base management software.

The Message Distribution and Collection System (MDCS) provides terminal-to-terminal communications and communication between terminals and on-line or batch-oriented application programs. It reportedly supports IBM 3270 or 3270-compatible terminals.

An MDCS user can inquire from an on-line terminal about the quantity and type of messages waiting to be received. The user can then route the messages to any video terminal or printer included in the communications network, according to a spokes-

man for the vendor.

The package is available for \$28,000 from McDonnell Douglas Automation, P.O. Box 516, St. Louis, Mo. 63166.

## ACC Emulator Fits Ethernet Line

SOQUEL, Calif. — Associated Computer Consultants (ACC) has announced an emulator that reportedly will allow customers to begin development of Xerox Corp. Ethernet hardware and software for use with Advanced Micro Devices, Inc.'s (AMD) AM7990 family of Ethernet integrated circuits due to be released in 1983.

The emulator will allow users to plug into sockets on any development board designed to receive the

For IBM 4300 Series

## Hydra-II Controller Out

MISSION VIEJO, Calif. — JDS Microprocessing Associates has announced the Hydra-II controller for

IBM 4300 series processors.

The unit allows users of IBM 4300 series and compatible processors to attach any device using an RS-232 port directly to their processors. The vendor said the Hydra-II is a self-contained unit and does not require a separate controller for attachment.

The unit costs \$6,900 for an eight-port system and \$9,900 for a 16-port system. Multiplexer channel cables are included in the purchase price. RS-232 cable costs 50 cent/ft, the vendor said from 24871 Pylos Way, Mission Viejo, Calif. 92691.

## Naked Mini Gets Packages

IRVINE, Calif. — Computer Automation, Inc. has introduced two communications packages for its Maxi bus- and Scout bus-based Naked Mini minicomputer system.

The Local Area Support Subsystem is an RS-449-based system said to permit interaction between several primary and secondary computer systems in a local area. The Telecommunications Applications Support Subsystem is an RS-232C-based product that features applications support involving public (switched) or dedicated (leased) communications lines, the vendor said.

A typical subsystem is priced at \$1,425, available from Computer Automation, 18651 Von Karman, Irvine, Calif. 92713.

## Visual Tech Extends Graphics Terminals

TEWKSBURY, Mass. — Visual Technology, Inc. has announced several enhancements to its Visual 500 and 550 graphics terminals, which are aimed at laboratories and scientific and business markets.

The terminals emulate both the Tektronix, Inc. 4014 and 4010. Advanced graphics enhancements are said to include circle and arc draw, resident vector draw, point plot, rectangle draw, multiple line styles and patterns with rectangle pattern fill.

The alphanumeric capability of the 550 is now Digital Equipment Corp. VT100/VT52 protocol-compatible, as well as being a buffered editing, block-mode terminal complying with the Ansi X3.64 standard.

The 500 costs \$2,495, and the 550 costs \$2,695 from 540 Main St., Tewksbury, Mass. 01876.

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For more information to help you compare the CONTINUOUS COMPATIBLE COMPUTER with the 4300s, contact Patrick Lucci at IPL Systems, 1370 Main Street, Waltham, Massachusetts 02254. 617-890-6620.

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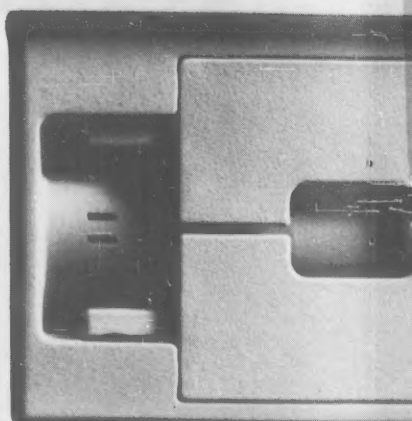
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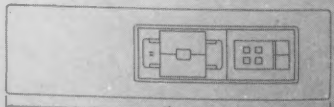
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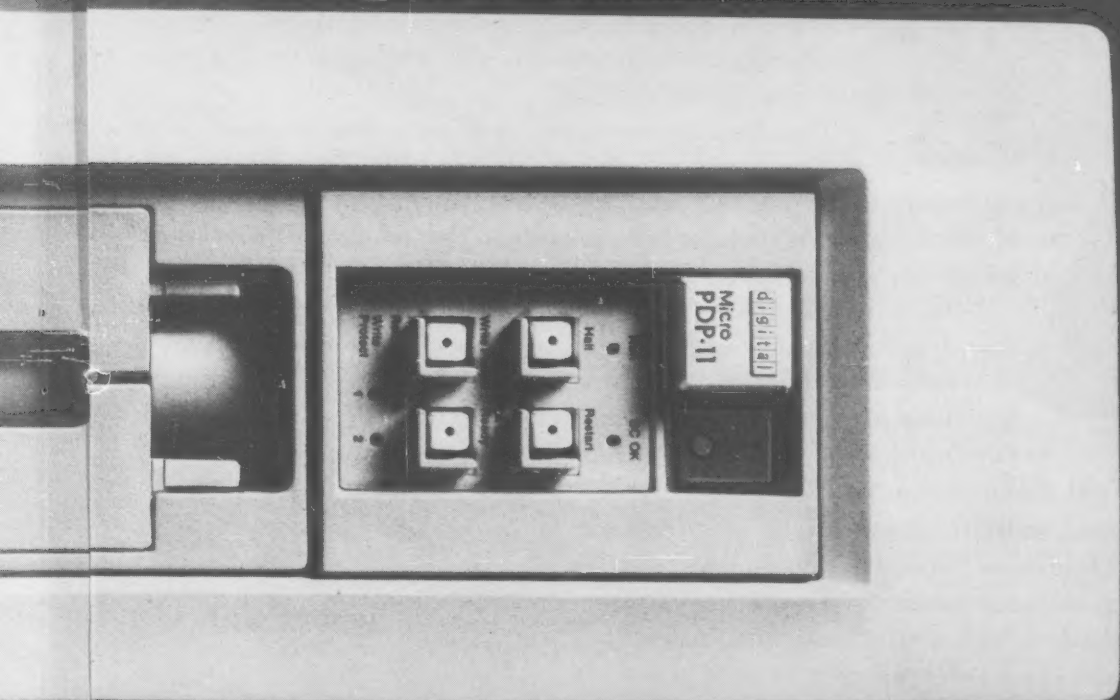
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British Prime Minister Margaret Thatcher recently paid Clive Sinclair a compliment. On her visit to Japan last September, she presented then Prime Minister Suzuki with a Sinclair microcomputer system. Clive Sinclair is founder and 95% owner of Sinclair Research Ltd., now the world's largest microcomputer production and sales operation in terms of number of units produced per month. For fiscal 1981, the firm had revenues of \$46 million and pretax profits of \$17 million. Sinclair is a visionary in the consumer electronics marketplace. He has been making waves for most of his 20 years in the business. Fifteen years ago, he was enthusiastically about a possible future pocket television. That took him 12 years to develop and eventually came on the market at a price of less than 100 British pounds. And 10 years ago, Sinclair produced the first true pocket calculator — even ahead of Japan.

IN DEPTH INTERVIEW:

# CLIVE SINCLAIR

In early 1980, Sinclair Research launched the ZX80, the first computer priced at less than £100. More than 100,000 were sold in 18 months. That micro was followed by the ZX81. Most of Sinclair's production is done by Timex Corp., which turns out 100,000 units a month in the UK and as many under license for the U.S., where the ZX81 is known as the \$99 TS1000. Last spring, Sinclair released the Spectrum, which will be redesigned and available in the U.S. later this year as the TS2000. Sinclair lives in Cambridge, England, the site of his company's headquarters. This interview with London-based freelance writer Rex Malik took place last fall.

By Rex Malik

**Y**ou are producing 200,000 units a month on both sides of the Atlantic. Do you expect to maintain this rate?

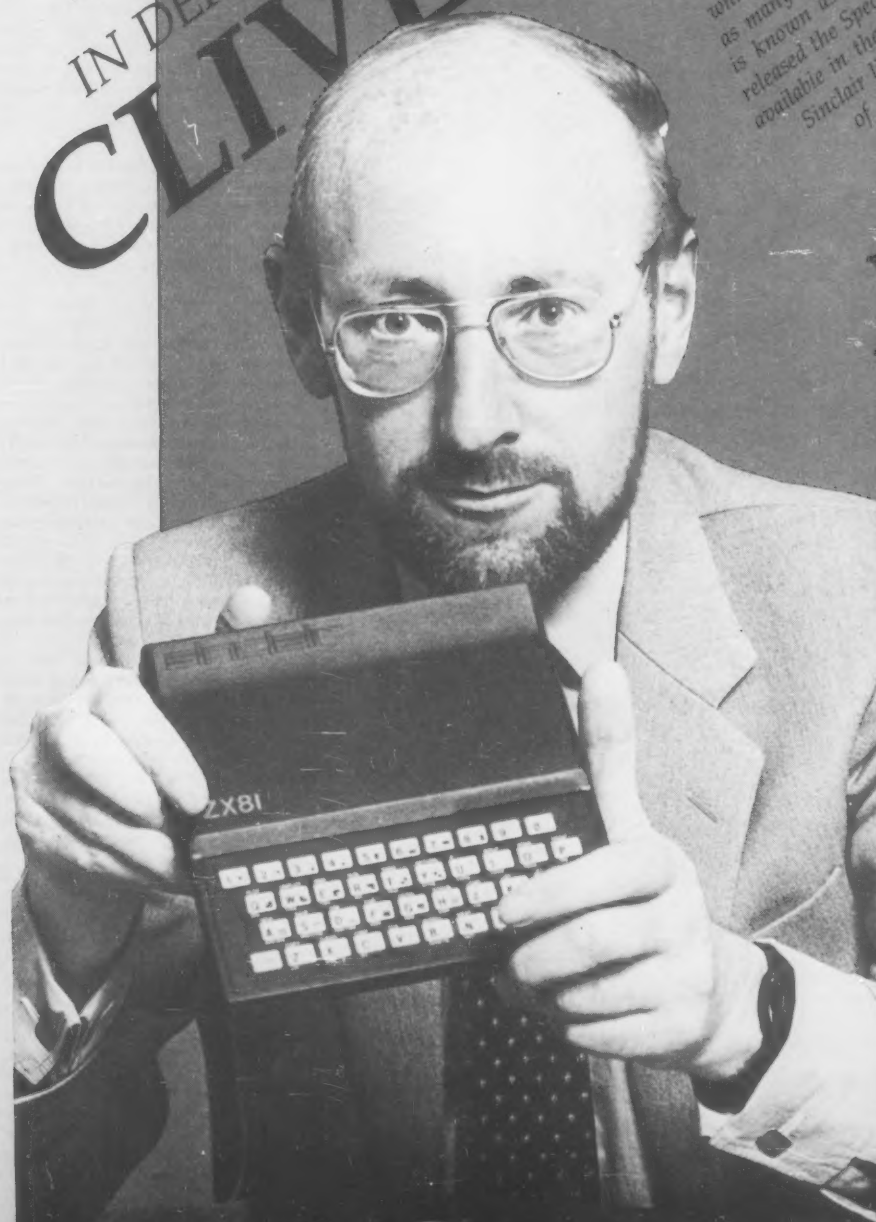
Oh no. We certainly hope to increase it. We are nowhere near able to support all of the possible market.

Why did your company turn out to be such a large microcomputer manufacturer and marketer, when 10 years ago you weren't even in the computer business?

As you know, I used to have a company called Sinclair Radionics, which was in the calculator business. Back in 1972, we looked at the market to see if there was a possibility of making a computer for under a thousand [British] pounds. It did not seem very likely, but we went on.

We were then tied in to the National Enterprise Board [NEB], the industrial investment arm of the British Government. They had the idea that we should concentrate on industrial instruments; they did not believe that consumer electronics would be a field in which Britain would be able to compete.

Sometime later, I split up with the NEB over this question of consumer electronics products. Looking at the products that would be essential in our armory, I realized that we would have to have a personal computer. That was the beginning of the ZX80



## IN DEPTH

project, which was really an attempt to get costs down. It was not going to be our main business, but it has turned out to be bigger than we thought — today, personal computers are the main part of our business.

I have really always been in the consumer electronics business. That business has always tended to change. First there were hi-fis, then calculators, then TVs. And now there are computers. Computers are very different from these other consumer

electronics products: They represent a much more long-term business.

In a way then, you are locked in a fashion that you were not with the previous technologies in which you worked. Given the continuation of some sort of recognizable economic climate, you will have to be there 20 years from now.

That's right. Luckily, we cannot foresee the day when a computer be-

comes just a standard box. There will be box-standard machines along the road, but we do not simply have to make those. There will always be something fresh waiting to be done.

What comes next?

The microcomputer evolves into a product that is really useful in the home. When that comes about, the user may cease to think of it as a computer, but that is still what it will be.

Is there a future for the microcomputer as a communications device? Most videotex terminals are singularly dumb. By contrast, the Austrians have gone a different route: They have based their videotex terminals around microcomputers, making them intelligent.

We are developing a videotex adaptor for our computers to provide just that. Initially, it is going to be a British standard. The American problem is, I am afraid, much more complicated.

How is the American market otherwise?

It is doing very well. We have been operating in the American market now for two years and are operating through others, primarily by mail order.

What is happening to the market in general? Is there an evolution taking place in which Sinclair products appear along with everybody else's, or does the next serious step come first from Sinclair?

I think we are all going in the same direction, but I think Sinclair will be the leader. I think that the next stage, both for us and for others, is to put microfloppies into domestic products. They have not been there in the past because of price. But putting them in, I think, makes a big difference. With bulk storage and bigger memories, we can handle these disks, which means that we can come up with much more powerful machines.

Now exactly what we do with those, I don't know yet. It is going to take an awful lot of imagination to come up with the software that uses these facilities.

I grant that people have gotten used to turntables over the last 40 to 50 years. But now there is a need for technology to operate in the home way beyond the tolerance of the hi-fi market. Don't we have here a problem in search of a long-term solution? Aren't we really waiting for nonvolatile very large-scale integration [VLSI] memory?

It looked as if bubble memory would fill this gap, but it does not seem to have lived up to its promise. I do not know why. Most prices quoted for it are out of the realm of possibility for our business.

I agree with you that we would greatly prefer a solid-state solution: It is far more elegant. I do not think that reliability will be a problem, because the sort of engineering tolerance we are talking about is used in domestic products, with videotape recorders, so it's within the reach of our technology.

One looks at the size differences of disks and VLSI, and one cannot

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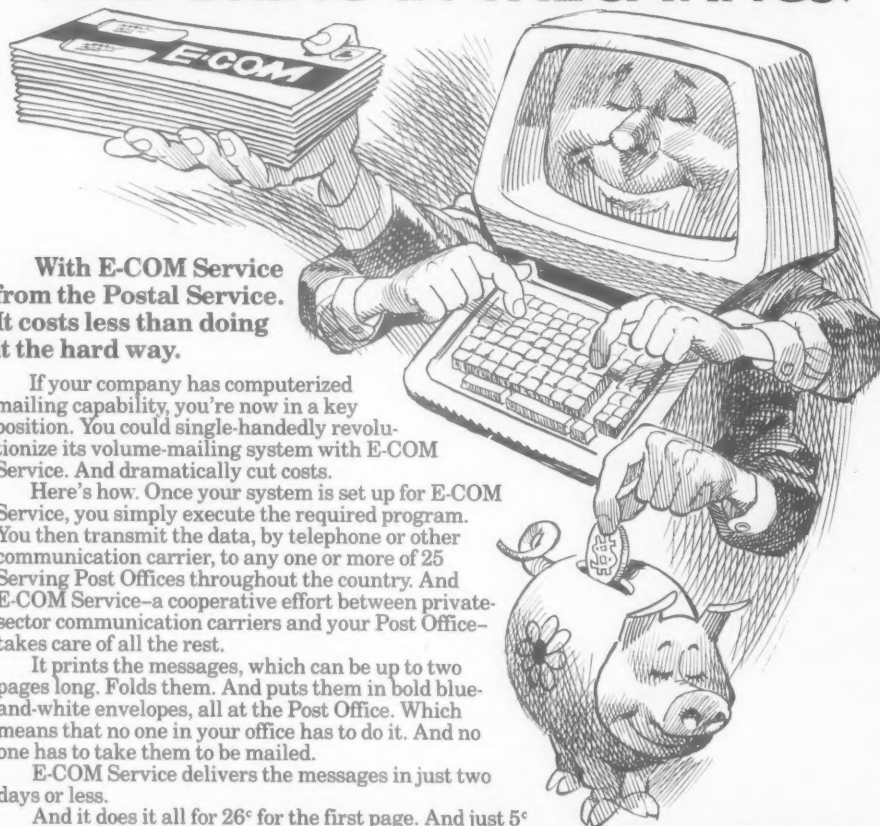
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## IN DEPTH

help thinking. "There has to be a better hole than this."

Large silicon memories will do the job as well. I believe that silicon disks will come along.

Yet we are still in the early stages of microcomputing in the home. What sort of bells and whistles are required to make these systems do things that people really need?

We are taking steps to make these machines more powerful, and this enables us to do more or less what we want. And we are hooking on to power links to the telephone and links to printers, so that users will be able to do some word processing.

Will improvement in voice technology, both input and output, be helpful? Are you working in this area?

We are not doing any such work at the moment. I am not too optimistic.

Why?

Because it is such a complex problem. It is very easy to make a machine recognize 20 words spoken by one individual. But it is an exponential problem: As soon as you get to the point of wanting, say, a thousand words to be understood, the problem is greater.

And if you want those thousand words to be understood with many speakers, it is an even greater problem. In order to do that, we need a new generation of machines, a new type of machine entirely — for example, an enormously parallel machine. And although such machines are in the research stage, they are a long way from the domestic market.

That does not mean to say that we are not watching voice technology and waiting for that day. But we are certainly not taking our existing computers and trying to make them do that job, because they are not able to do it.

So this is really a problem of 10 years out.

That's the sort of order.

Then we are talking of the time scale of Japan's fifth generation, which leads me to this: Do you think you can really compete with the Japanese over the long haul? So far you have been very lucky...

That is not being very lucky: That is what we do all the time. That's our business. We have spotted needs before the Japanese time and time again: the calculator business, the digital watch business, the computer business.

And time and again in the past, the Japanese have come in and benefited from that. In the computer business, some of that same thing will happen. But we have the advantage

this time: We have deliberately established a volume of scale before they get there.

But to get back to your point, which I think is a very important one: As we move toward the fifth generation, it becomes more and more a problem of advanced silicon technology. I am concerned that this may not be available to us in Britain; it may only be available in Japan or possibly in the U.S. America is waking up, but it's closing its doors to the

outside world in this field.

You are producing over two million units a year. What would you expect the numbers to be like in two to three years?

Let's first put those numbers in perspective. The color television market in Britain is something over 2½ million units a year. There's no reason why the computer market should not become a similar size in due course.

When you start talking in these numbers, the software becomes even more critical. Software has to become an automated-production consumer product, but it certainly does not look like that now. What do you do to give people new facilities?

In a few words, I do not know.

We are very concerned with that problem and looking at it at the moment. We do not have all the answers



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## IN DEPTH

yet. We are using the best facilities available. ICL [International Computers Ltd.], for example, is writing software for us.

We are beginning to look at advanced software generation tools, but that is not really going to yield any results for a long time to come.

We are concerned with what languages we should be using. People in the organization are very much inclined toward Prolog, for example.

**It seems that if you talk in the volumes you mention, all the languages we have are unsatisfactory. Would you agree?**

Yes, I do. They are so laborious. They are not redundant. You have to write perfect code, and that is something we have to get away from.

If I write you a letter, I do not have to be absolutely precise and you still understand my meaning. If I leave a word out, you understand it. There is redundancy in the sentence structure.

I think we have to get to the point where we can program computers in that way as well.

***'In 10 years, when we start to see fifth-generation machines, we will face a situation that one can only describe as extraordinary. We will face machines that can be described as truly intelligent.'***

**What I have always wanted to see is a tool to be used when writing your own code that tells you if you are doing it wrong.**

Prolog is a bit like that; it is the first step in that direction. But I want to approach it another way. Not so much that it tells you when you are wrong, but it tells you whether it understands.

**How do you produce something like this?**

You do it interactively with the computer. To take an extreme case, you can tell the computer what you want to do in normal English. And I do not think that we are that remote from this.

If it did not understand you, it

would interrogate you in normal English. It would say, "What do you mean by so and so? Expand the point you have just made. Did the word such and such mean this or that?"

It is an interrogator. You would work with the machine in exactly the same way you would work with an employee.

That is the route we see it going, and we see Prolog as a step on that road. We are implementing Prolog on the Spectrum for that reason. That should be out soon, and we shall also have Logo.

**There's a good Logo community already in existence in the U.S., though there is not one in Britain. Will it be aimed at the U.S. community?**

It will be aimed at education generally. Although, as you say, there is no community in Britain yet, there is not anything else available to preclude it, so it could grow up as computing in education expands.

Initially, we are giving it away free to schools to encourage its use. We will put it out as a cassette, and then we will put it on the market.

**Looking five years ahead and considering the large volumes you foresee, we are likely to have many incompatible microcomputers on the market. Or are we? Is it possible that we might see the same situation that we have in mainframes — if not a dominant manufacturer, certainly a large volume of compatible systems on the market? Have you thought about this?**

Yes, very much. There are two ways of approaching a situation in which we have compatible systems. One is to try to form committees of the principal producers to agree on a standard. The other is for a company to go out and establish so strong a position that everybody comes along behind it — the IBM approach.

It is the latter that I think will happen in the micro world, because everyone does not seem to be working together. There are several people who look as if they might establish a standard.

IBM might, but it is not looking very likely at the moment. We might, and that is looking far more likely. We alone in the microcomputer business have licensed large companies to take our technology — alone because only we have a strong enough technology to justify the payments that will be involved.

The license agreements we have

are not just for hardware: They are also for software. For example, Timex Corp. is committed to Sinclair Basic and so is ICL. Those commitments at this stage do not make a lot of difference, but will as we move on. If you look at the market now, all the people making peripherals for the consumer side of the personal computer business are making them for our machines.

And the stronger we get — the more machines we get out — the more that is the case. If new people want to enter the business, if they want to enter it at all, they're going to have to make their machines compatible with those peripherals.

And in doing that, they will make their machines compatible with our machines. So, it's a de facto standard.

**What are the likely impacts of computing on society in a five- to 10-year time frame?**

I think that five years is not going to be too dramatic. But in 10 years, when we start to see fifth-generation machines, we will face a situation that one can only describe as extraordinary. We will face machines that can be described as truly intelligent.

**How will we feel the effects of those? What will be the impact on employment, for instance?**

I think the computer is a source of jobs. It is really the lack of demand that causes the recession, the unemployment.

And there is a lack of demand because people's perceived needs have been filled. That is not to say that all their needs have been filled, just that many of those they perceive have been. They don't feel a burning urge to work harder for a particular product.

The computer will generate new products that people will want.

**What sort of new products?**

Well, say a home robot. There is no reason why it should not do what any servant of the past did.

**But that is some years away. What happens in the interim?**

Long before that you have nonmobile intelligence. I think that the expert systems route is very exciting. The home doctor, the home medical aide — that's the sort of field that is attractive.

**And what would be the reaction of the professional medicos?**

Sheer horror, I should think.

**But the storage requirements for systems like this are going to be immense, because they are going to have to carry very large data bases. There are then two routes you can go: one is the videotex route, in**

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## IN DEPTH

which you pull it all down from the center...

Oh no. It will have to be local, because if you are going to have to search through this vast file very rapidly, then it must be local.

You are looking then at home computers that turn out to have very large amounts of library storage. Disk storage?

In an expert system, I am not sure that it can be, because you have to search through all the memory.

So you have a standard file that is burnt in? Yet if one remembers that all the expert systems fields are changing and developing, how do you proceed to keep people up to date? You change the chip once a year? You sell somebody an update like you sell him an encyclopedia?

Yes, that's right. You could sell him an update over the telephone. It might be in nonvolatile memory, but nonetheless changeable.

But the structures to do something like this do not as yet exist.

Oh no, it is a massive new field.

So you get to a situation where the systems to which you are committed permeate society. How does society treat them? Do you see society moving in and saying, "Hey, these things have to be policed"? That's what we do with everything else.

I do not see how it can be avoided. I suppose that it is slow to happen in a rapidly changing field, and that is the one benefit. But eventually society does police almost everything.

What are the main stumbling blocks to the expansion of the market?

Our main stumbling block at the moment is in getting enough production. I think the market has grown so rapidly it has caught us unaware. The problem has been that the plans we made have been proven wrong.

Just you? Or you and everybody else?

Oh Lord yes, not just us. We anticipated a bigger market than anyone else, but even we were not large

enough in our forecasts.

I cannot put numbers on it, but I can put it this way: When we brought out the Spectrum, we thought that the market could not be as large as the ZX81 market, if we didn't initially advertise it to the general public.

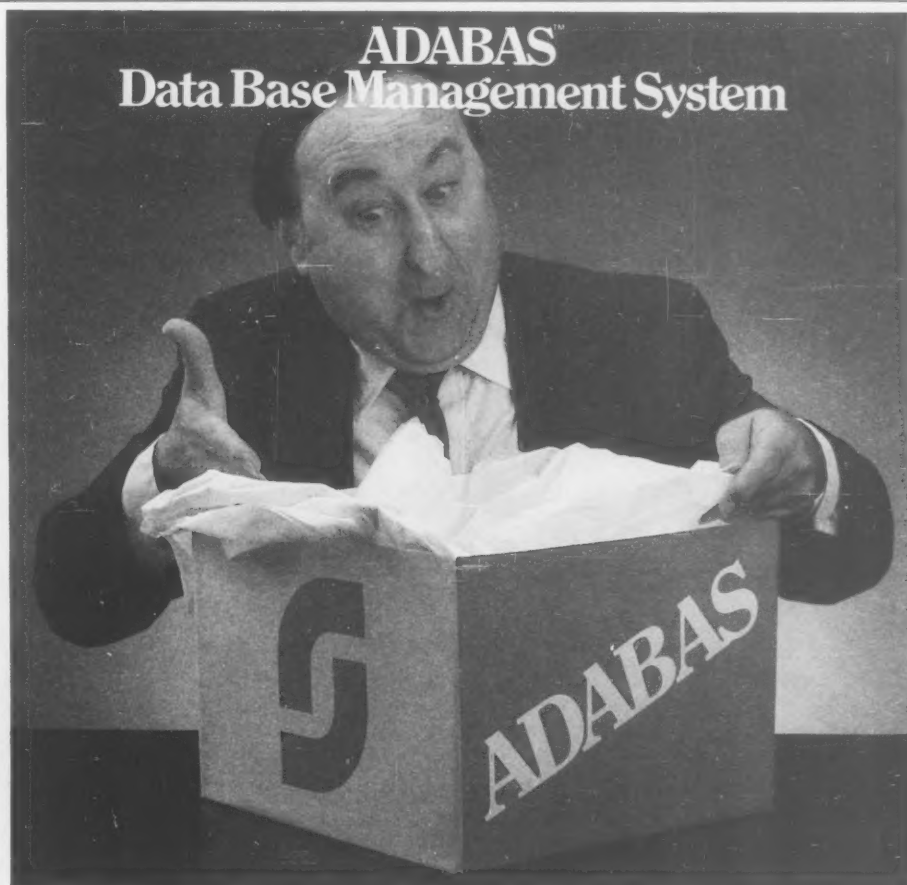
But it was, and that was unexpected.

We are seeing a demand from the general public for the Spectrum, which is contrary to our general ex-

pectations. We do not even know why they are buying it.

Obviously, we were expecting some demand. We can even see some reasons for people to buy our machines! But it has gone way beyond that.

The interviewer, Rex Malik, is a 25-year veteran of computer journalism and a consultant to the British Broadcasting Co. for its computer literacy series.



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# The Psychology of DP

## A Career Planning Tool

By Judith E. Larkin

For every occupation there is a stereotype: the accountant seriously poring over columns of numbers, attentive to every detail; the absent-minded professor, bespectacled, in baggy clothes; the banker impeccably attired in a pin-striped suit.

Data processing people are not exempt from such stereotypes. To an outsider, they bear mysterious titles and seem to spend hours by themselves staring into a monitor, communicating with a machine. Are DP professionals really eccentric, unsociable, overly independent and unfazed by social conventions? Perhaps the time has come to put aside misleading generalizations and seek a better understanding

*(Continued on In Depth/10)*





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# Professionals: Two Views

## Managing the High-Tech Creative

By Marsha Sinetar

Sharon is a bright systems analyst. She suspects that her inventive ideas, her absorption in work and her intensity threaten her boss. Yet she thrives on new ideas and methods and believes her intensity enables her to concentrate best. She feels her boss is undercutting her future, and her resentment is growing: "My boss doesn't understand what I'm talking about. He hates it when I propose new ideas. Even colleagues are reading his attitude and now seem irritated when I speak up in meetings. I'm not good at the little political games needed to get my thoughts across. I feel angry and stuck."

Sharon's creative personality is working — unsuccessfully — in a  
(Continued on In Depth/14)

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Another in a series of messages on advanced technologies from Honeywell Information Systems.

**Many data processing professionals are being faced with demands for networks capable of moving increasing amounts of data among more and more locations. Up to now, application-dependent network structures—with their inherent risk of major conversions—offered the most readily available response. Honeywell's Distributed Systems Architecture (DSA), however, provides a more practical alternative. An application-independent networking structure, it fully supports public, value-added, private and international nets.**

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Honeywell's DSA establishes standards for data movement and application cooperation in compliance with the International Standards Organization's (ISO) open systems reference model. The architecture, which is not dependent on specific technology or techniques, keeps applications and communication processes separate. Thus DSA is transparent to the end user. DSA creates a cooperative, flexible environment within which the user can build and phase in a communications system that can handle current applications and grow to meet new domestic and international demands.

## **DSA Structure**

DSA's flexible set of rules, protocols, and interfaces allows users to configure and implement data processing systems and networks to help meet the needs of geographically dispersed organizations. Introduced in 1980, DSA consists of a seven layer architecture divided into three groups. The implementation of the first four layers in the Communications Management group controls physical exchanges across the network. The next two layers, the Message Management group, format messages so that the communicating entities can understand each other. They also contain the dialog mechanism that permits communicating activities to synchronize their actions, and the presentation control services which provide application independence

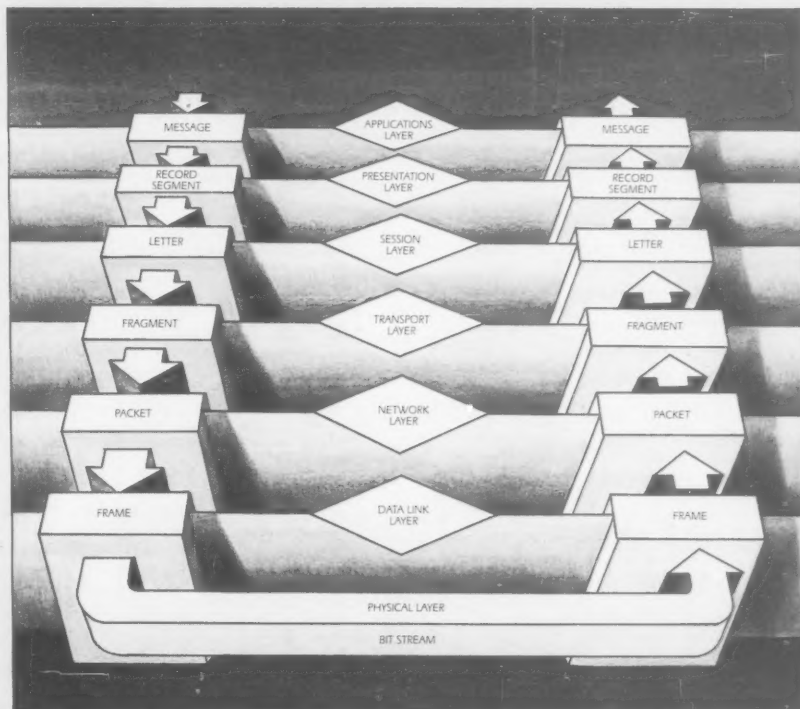
from data format, character codes, and terminal handling conventions. The seventh layer, Applications, defines the logical rules to which computer applications conform when communicating. Finally, each layer of DSA also provides network administration and control data to enable overall network control of the distributed system.

## **Network Support**

Because DSA conforms to the ISO open systems model, it's certified as providing native support for the CCITT international X.25 packet-switched and X.21 circuit-switched network protocols. These protocols are being implemented in a growing list of public data networks around the world as well as in value-added and private networks. DSA products support such X.25 based networks as TELENET and TYMNET (United States), DATAPAC (Canada), DATEX-P (Germany, Austria), DDX-P (Japan), DN 1 (The Netherlands), EURONET (European Economic Community), PSS (United Kingdom), EDWP (Switzerland), and TRANSPAC (France). Also supported is the X.21-based NORDIC Net (Scandinavia, Finland). DSA uses High-level Data Link Control (HDLC), also an ISO standard, for data communications between intelligent devices in private networks. Users can configure hierarchical, peer-coupled and hybrid network topologies.

### Product Implementation

DSA already enables medium-scale and large-scale host computers and mini-computers to operate in a variety of network configurations. Specialized network processors can be utilized for front-end processing, remote concentration and switching, in addition to communications control and administrative functions. The implementation includes such distributed processing applications as file transfer, remote job entry, terminal concentration and two-level transaction processing as well as office automation applications, including document distribution and host storage, and printing of documents. In addition, DSA administration permits monitoring, control, and maintenance of the network from one or more control sites.



DSA consists of seven layers of functions and protocols governing data handling among network nodes. DSA's implementation of the bottom four layers makes physical exchanges across the network transparent to the end user.

### Future Growth

DSA is an important part of Honeywell's implementation of its Distributed Systems Environment (DSE). Future DSA developments will support fully-distributed transaction processing with system-supplied coordination, control, and recovery, load leveling, and resource sharing across computers. This type of peer network will allow host and satellite processors to cooperate as full equals in distributed systems. The open architecture will be further enhanced to meet evolving international network standards while protecting investments in systems already installed. Additionally, data bases will be partitioned across multiple

processors with automatic access and updates at all locations. Thus DSA is part of an evolution to fully distributed systems with globally accessible resources.

### More on Distributed Processing Networks

For an in-depth description of the DSA open architecture call our toll free number, 800-343-6294 (in Massachusetts call 617-895-6000) or write Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.

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## IN DEPTH

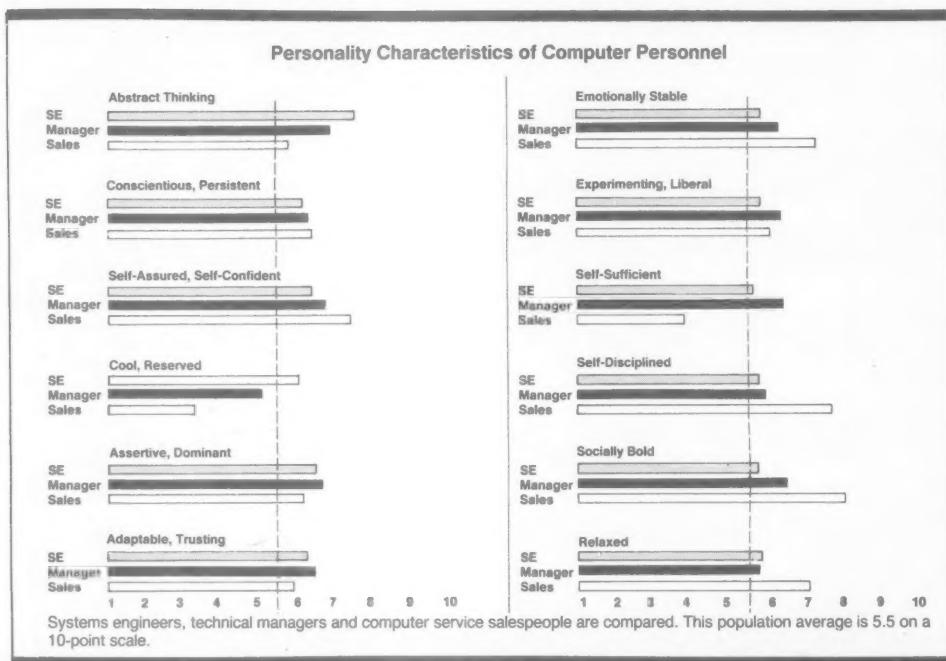


Figure 1

(Continued from In Depth/6)  
— through psychological testing —  
of the nature of DP professionals.

For the past two years, Computer Task Group (CTG) in Buffalo, N.Y., has been offering a test to its employees to help them learn more about themselves and improve their career planning. Under the supervision of a psychologist, CTG has been administering a personality test called the 16PF. The test includes comparative data so that individual results can be interpreted against population norms.

To date, about 150 CTG employees have taken the test, including pro-

grammer/analysts, marketing representatives and most of the technical managers. Everyone who participated in the hour-long testing received a confidential, five-page, computer-generated narrative description of his personality, as well as a summary profile showing his results compared with other adults and other groups within the company.

The positive reaction to this relatively inexpensive test has resulted in its inclusion as a regular part of management education programs. However, what was intended primarily as an opportunity for individual self-assessment has become a

source of valuable information about computer personnel — not only programmers and systems analysts, but those who have been promoted from the technical ranks to managerial positions, as well as the computer service salespeople.

Group profiles of DP people have been developed by pooling individual data from 16PF. The systems engineer group at CTG includes all the technical people who work as applications programmers, systems programmers and systems analysts. The managers of these systems engineers usually come from the technical ranks, as do the marketing representatives, who typically have entered sales after some experience at the less senior systems engineer level. Psychological testing has revealed three different patterns of personality that characterize individuals in these three job categories (see Figure 1).

This profile of computer personnel is based on a group composite. There may be considerable individual variation of any of the factors described, and even the same person at different times or in different situations may show behavior that departs markedly from the profile. What the profile shows is how the three groups tend to be alike. Based on recruiting and training practices, there is no reason to think that CTG systems engineers are atypical; however, caution must be exercised in generalizing before more data has been gathered, especially from personnel not in a computer service company.

#### Profile of Systems Engineers

Psychological testing has identified six aspects that are characteristic of systems engineers:

1. *Able to engage in abstract thinking.* Not surprisingly, systems engineers are bright people — fast learners, intellectually adaptable and significantly more intelligent than average. Their work requires the ability to think abstractly, to solve problems using logic and reasoning. Understandably, then, if their jobs are not stimulating or programmers feel underutilized, they may look somewhere else for challenging work, as evidenced by the pattern of frequent job changes found in the industry.

2. *Conscientious, persistent.* Systems engineers stand out as being persevering, responsible and emotionally disciplined. To a great extent, success in doing the work itself requires these characteristics. Beyond merely doing the job, however, these traits make systems engineers work nights and weekends, for example, to generate an operating system that will be ready when other programmers need it.

High intelligence plus a high degree of persistence results in a strong drive to achieve. As J. Daniel Couger and Robert A. Zawacki report in *Motivating and Managing Computer Personnel* (Wiley-Interscience, 1980), data processing professionals have higher growth needs than people in any of 500 job categories surveyed in that report. They have a strong need

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## IN DEPTH

for personal growth and accomplishment — to be stimulated and challenged and to develop. The necessary foundation for such accomplishment is intellectual capacity combined with a strong inclination to be conscientious, persistent and dedicated to the task.

Closely associated with conscientiousness is superego strength or strength of character. This can be seen in the systems engineer's concern with moral standards and rules.

In a 1981 job satisfaction survey, CTG employees indicated that their jobs gave them a very high degree of satisfaction with regard to their moral values. While perhaps not critical to the bottom-line success of a business, it appears that having a job that is consistent with their moral values may be especially important to systems engineers.

3. *Self-assured, self-confident.* Systems engineers, on the whole, tend not to be insecure or worrying types. They often project a high degree of optimism about their ability to do a job — sometimes even overoptimism, when it comes to having programs ready by a given deadline.

This self-assurance may be accompanied by a lack of concern about other people's approval or disapproval. The programmer receives rapid feedback about how he is performing and whether the outcome of the work is satisfactory. Getting the program to run the way he wants, though, is more important to the programmer than the approval of his peers. The systems engineer's self-confidence is built up more from knowing that he is doing the task successfully rather than from social feedback from co-workers or supervisors.

In this regard, Couger and Zawacki report that DP professionals have low "social-need strength" or need for interaction with others.

This is not to say they are antisocial, but rather that their source of reinforcement or satisfaction is less likely to come from others than from doing the job right. Regardless of how self-confident they were when they started, people who remain in DP are likely to develop an even greater confidence in their own capacity from their success in carrying out their work.

4. *Cool, reserved.* Personality testing reveals that systems engineers are, in fact, more aloof, detached and reserved than people in general. They have a desire to be precise in their way of doing things and show more of a preference for working alone and working with things, rather than with people.

Test scores indicated a tendency to be stiff, even critical, as opposed to warm and easygoing. Although these scores are not extreme, they are different enough from average to contribute to the stereotype of the unsociable programmer.

5. *Assertive, dominant.* Computer people tend to be authoritative, forceful and action-oriented. Not easily upset by authority, they may come across as headstrong and unconventional. While, of course, each individual is different, the combination of high intelligence, self-confidence and assertiveness may result in the prima-donna syndrome occasionally seen in systems analysts. In the extreme, they may demand admiration and lack humility.

6. *Adaptable, trusting.* Systems engineers tend to be adaptable and accepting of change rather than inflexible or dogmatic. These characteristics are consistent with the high-growth needs found by Couger and Zawacki. Adaptability is necessary for survival in a field where technological advances occur so rapidly and where, without an openness to reeducation and updat-

ing of skills, one's obsolescence is virtually guaranteed.

A trusting and accepting nature makes computer people easy to get along with (though not especially easygoing), tolerant rather than tyrannical and ready to forget difficulties rather than dwell on frustrations. This adaptability is not limited to technical areas, and the test results suggest that systems engineers would be open to innovation in the behavioral and communications areas as well.

They are also predisposed to be good team members when they do work with others.

Figure 2 compares systems engineers and people in various other occupational groups. By calculating a statistic called the "coefficient of pattern similarity," the degree of similarity between the group of systems engineers can be compared with any of the other occupational groups for which personality data on the 16PF is available. Clearly, systems engi-

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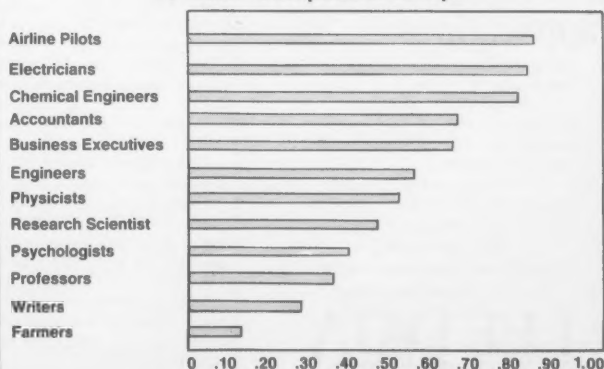
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Similarity of Systems Engineers  
To Other Occupational Groups



Numbers represent the degree of pattern similarity between the personality of the systems engineers and other occupational groups. The higher the correlation, the higher the degree of similarity.

Figure 2

## A CAREER PLANNING TOOL

In Depth/12

### IN DEPTH

neers are very unlike professors, writers and farmers and highly similar in personality to chemical engineers, electricians and airline pilots — a diverse group which none-

theless shares a systematic, procedural orientation to its work.

The DP manager has usually been promoted from the systems engineering ranks

and has a technical background. The managerial position, however, involves a high degree of social interaction and requires behavioral skills, including the ability

to communicate effectively with a wide range of people.

No longer responsible for doing the technical work themselves, managers must now get the work done

through others. While the managerial job requires interpersonal skills, a predisposition to social interaction was not a strong characteristic of the systems engineers. Are the managers different?

Managers were similar to systems engineers in five of the six aforementioned traits. Unlike the technical people, however, they are not cool and reserved — and they are outgoing and warm. The DP manager is also distinguished by four other traits:

1. *Emotionally stable.* Managers stand out as emotionally mature, stable, unruffled and realistic about life. They tend not to let their emotional needs obscure reality.

2. *Socially bold, venturesome.* Not shy or timid, managers are sociable, spontaneous and apt to be adventurous. They are particularly suited for the task of dealing with people.

3. *Experimenting, liberal.* DP managers have inquiring minds and are inclined to question traditional ideas and experiment with problem solutions. According to the *16PF Handbook*, executives and scientific researchers also have these traits.

4. *Self-sufficient.* DP managers are self-sufficient and resourceful, accustomed to going their own way, making decisions and taking action on their own.

As one goes from the technical to managerial positions, there appears to be an increase in personal comfort and social competence. The CTG managers are able to make decisions on their own and deal with people in personal and business encounters with relative ease. Whether this change comes about from training and success on the job or whether managers have more of these characteristics at the outset cannot yet be determined, as nearly all were experienced managers at the time of testing.

By retesting the current nonmanagers and comparing those who later become managers with those who do not, it may be possible to determine the extent to which the manager's personality profile is present at an early stage or whether it is developed through training and experience.

#### Marketing Representatives

The personality profile of the marketing representatives reveals that they are significantly more outgoing,

## Why two when one will do?



### Lee Data's universal terminal system design provides access to both 3270 and VT100 applications.

Now with Lee Data's new 3270/Async Communication System (Series 400) you can eliminate the cost and inconvenience of needing separate displays for access to 3270 and VT100 applications.

The Lee Data universal terminal system approach is another innovative Lee Data design that allows a single Lee Data display to access applications and data from an IBM CPU, a non-IBM system such as DEC, H-P or Prime, and timesharing services. And a simple command entered from the display keyboard is all that is required to switch from 3270 to VT100 operating mode and back again. What could be easier?

The Series 400 System incorporates a new hybrid approach to system operation that is simpler and more efficient than

protocol conversion. This approach allows a Lee Data controller to provide dedicated 3270 and VT100 processors for concurrent, but independent application access.

In addition, a single Lee Data controller provides you 3270 compatibility via either a remote BSC or SNA/SDLC or a local SNA or non-SNA interface, as well as 1 to 16 RS232C ports for your asynchronous application needs. Line speeds available are from 300 to 19,200 BPS.

The Series 400 System also provides you support for up to 32 devices, including Lee Data's unique All-In-One display that offers dynamic selection of 4 screen sizes—three 80-column and one 132-column. Lee Data's 3279-compatible color displays and a full line of printers are

also available as part of the 32-device complement.

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## IN DEPTH

socially bold, emotionally mature, self-assured and relaxed than technical people. Like systems engineers and managers, they are more dominant, assertive and conscientious than the average person.

Unlike the stereotype of the impulsive happy-go-lucky salesman, these computer sales personnel are highly self-disciplined and exert strong control over their emotions. This is needed in order to face the possibility of rejection and get "up" for another sales call.

Being, in addition, persistent, socially bold and self-confident, these market representatives appear to have all the qualities deemed necessary for success in sales. Unlike the technical people, however, they are inclined to follow protocol and adhere to social convention, behaviour which is also important for winning business acceptance.

Not surprisingly, marketing representatives are significantly more group-oriented than average, preferring to work and make decisions with others. In this regard, they stand in sharp contrast to the technical and managerial groups, as they are considerably more dependent on

others for social approval. Approval from others is, of course, an integral part of being successful in sales, and it would appear from their success that the market representatives' personality profile is most consistent with the requirements of their job.

#### Matching Personality, Job

The results of psychological testing can begin to dispel some of the myths about DP people and bring about a better understanding of the complex nature of people who enter and move within the computer field. But description, however, is only one positive outcome of testing. Beyond the immediate benefit to the individual, good psychometric instruments allow us to make use of sophisticated techniques for predicting job success.

The profile-matching technique in particular, which compares the personalities of the systems engineers group with other occupational groups, is a valuable statistical tool for early identification of those technical people with managerial or sales potential.

At CTG, it is now possible to identify which of the technical people have personality profiles most re-

sembling those of the successful salespeople and managers. Although no two people will be exactly alike or match the profile exactly, there remains a pattern of shared similar traits that does characterize the individuals in each of the three occupational groups and allows predictions to be made.

While psychological testing has far to go to predict with certainty who will be right for a particular job, it does indicate what the people in

those computer-related jobs are really like. Techniques from the behavioral sciences have helped dissipate the stereotype of the programmer or systems analyst as a weird or eccentric "computer freak."

#### About the Author

Dr. Judith E. Larkin is an associate professor of psychology at Canisius College in Buffalo, N.Y. She is an industrial/organizational psychologist specializing in the computer service industry.

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## IN DEPTH

(Continued from In Depth/7)  
structured environment. If she is to survive and flourish there, she may have to alter her thinking. Management may also have to find ways of loosening its structure.

Technical thinkers like Sharon are often task-oriented. Numbers, ideas and machines come first to the task-oriented, people's concerns second. Task-oriented people prefer working alone, avoid social small talk and dislike interruptions when focused on a

project, even when their jobs require that they work with others.

Problems arise when creative types express ideas if they do not consider the needs of others. A sense of urgency accompanies their presentation of new ideas, and this can make them appear insensitive to the status quo, to others' egos.

Creative people can develop superior attitudes, often defensive responses to seeing their ideas rejected. These ideas often collide with the or-

ganization's natural web of political hierarchies. Creatives people's "superiority" often gives way to outright frustration in the face of normal delays in a company's decision-making process. Their frustration can lead to isolation.

If isolation persists, teamwork easily erodes. High-tech environments fragment when too many employees focus too narrowly on purely personal interests or pet projects, neglecting company objectives.

In these situations, management must build strong team attitudes and communicate in ways that lead creative people toward the values and needs of the group — of the total organization — and away from self-interest. But this is easier said than done.

For example, a corporate client discovers that communication problems within a special task force prevented it from accomplishing its mission. The group consisted of eight technical specialists, each from a different department. A series of problems was to be solved for one of the company's industries, but the mission stalled when communication among team members failed. Each member believed he knew more than every other member.

It was not until forceful feedback was given, in private sessions, that members began to notice their own communication barriers and hear what others had to say. Management could have, in this instance, recognized the problem and asserted itself sooner.

Management must be sensitive to the unique working characteristics of creative employees. Also, it must resolve the basic conflict between the need for orderly organizational processes and the intense need the creative have for freedom of expression. Improvement of communication skills at the managerial level is an important first step.

Creative employees are rarely nurtured and groomed into contributive organization players by management. These employees are not usually helped to think of the needs of others when generating and presenting ideas. As American industry evolves into the postindustrial era, an era characterized by unprecedented change and ambiguity, the need for creative thinking grows more urgent.

At the same time, educational in-



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stitutions and high-technology opportunities make a high-tech, creative population more probable. Our larger, more bureaucratic organizations could find themselves in serious trouble if steady and increasing injections of creative intelligence are not shot into the system.

Creative intelligence is among the commodities companies can least afford to waste. Yet most organizations — and most managements — are unfamiliar with its characteristics.

Being creative entails bringing something into existence that never existed before — imposing order on chaos, finding hidden patterns in disorder. That process involves experimentation, analysis, insight and even failure.

Management should first recognize and respect the fact that creative people look at things differently: They invent the unexpected and the untimely. Creative people often bring the majority of their difficulties on themselves. When this is understood, management can help creative people work with, rather than against, systems and can help them avoid strangulation in their working environment.

#### Five Questions for Management

Management can ask itself five questions about its stance toward the high-tech creative employee:

1. *Do managers unwittingly punish idiosyncratic behavior or thinking?* Some companies subtly punish the creative person through social isolation, put-down humor, holding him to rigid job descriptions, denying him promotions or subjecting him to review sessions in which he is urged to be "more like others."

2. *Do managers know what talents their subordinates have? Do they know*

*what makes work satisfying for each employee on their team?* People's work needs vary. Money is usually not the most important element of work fulfillment for the creative person. Creative types need the satisfaction of using their minds on complex problems.

3. *Do managers help creative people find both satisfaction and discipline within the working day?* Creative people must want to channel their intensity toward the greater good of the team. Managers who cannot help creative people see ideas and problems from a variety of perspectives cannot help pull creative effort into usable form.

4. *Do managers help creative people work with others to achieve personal goals?* Five strategies can help managers work with creative employees (see box). The objective is to help employees express novel ideas appropriately — so the goals of others and the company are met.

5. *Do the organization's practices encourage and use creative talent?* A variety of promotional paths need to exist in order to utilize creative talent. Creative people need to advance into positions more challenging and personally satisfying, positions not always along the managerial path for those with technical leanings.

Leadership must never underestimate its power to be mimicked. When top management is staid, conservative and conforming, most middle management will follow suit. By scrutinizing its own practices at all levels, management can develop creative management techniques to serve the creative subordinate.

One of the best techniques is the mini-think-tank. Communication techniques and a dependable vehicle for open-forum problem solving brings forth many creative ideas, as

well as serving as a sound way of providing recognition and acknowledgement for bright, innovative employees. The mini-think-tank technique cannot be used by an organization whose top management is, at heart, closed to the creative spirit.

Managing creative talent, especially the highly specialized technical innovator, is a challenge. But when these employees are encouraged and helped to contribute gener-

ously and with self-discipline to the needs of a company, everybody wins.

#### About the Author

Dr. Marsha Sinetar is president of Sinetar & Associates, Inc. in El Segundo, Calif. She is an organizational psychologist, mediator and futurist. Her firm provides management advisory functions to corporate top management in human resource planning and development and mediation.

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### Strategies to Help the High-Tech Creative Get Ideas Across to Others

Each point calls for a gradual enhancement of interpersonal skills and attitudes. Each also demands that managers be effective, adroit and mature communicators. These ideas involve no "quick fix."

1. Help the individual talk about new ideas in terms others can understand — so that they can see how new ideas are helpful to their own goals.

2. Help the individual state criticism of the "old way" constructively, so that language does not tear at the fabric of other people's authority, or egos, or imply that the proposed change is the "right way," all other routes to the same end being wrong.

3. Help the individual become sensitive to others' fears and needs. No one really likes abrupt change or wants to feel he isn't bright or valuable, and the creative employee's expressions must show that he accepts others as important in their own right.

In this category, employees should be helped to evaluate themselves as listeners; they should be helped to listen to the objections of others (rather than being offended or turning off to counter-suggestions) and should be given very specific, firm feedback if their communication styles are creating problems.

4. Help the individual focus on the job itself — not on the possible status he wishes to have as a result of his creative input. If he is perceived as being self-serving, instead of as serving the interests of the team or the company, even the best suggestions will be turned down.

5. Finally, help the individual understand the importance of working with and for the benefit of others — perhaps even to rate himself on the ability and willingness to be part of the team.

# On May 18th, **Computerworld** launches its first communications satellite . . .

## . . . satellite publication on communications, that is.

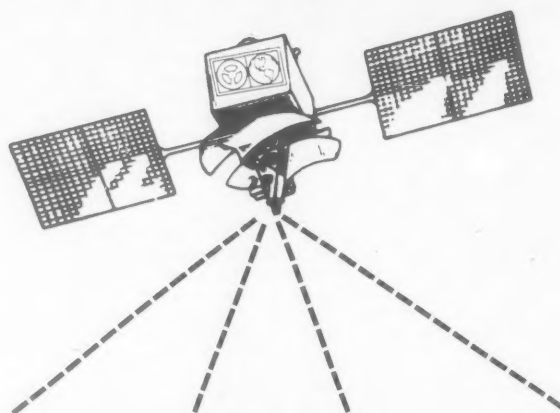
We are launching a new publication devoted to in-depth coverage of the broad spectrum of voice, image and data communications. *Computerworld On Communications* will examine communications issues, technology and applications from a systems perspective.

We recently did a study of *Computerworld* subscribers to determine their level of involvement and interest in communications. Of the 84% now using or planning to use communications equipment and services, 72% are personally involved in its selection and/or implementation. We found that these subscribers depend on *Computerworld* for communications information and prefer its coverage by more than 4 to 1 over the next publication in the field. This segment of our audience has a critical need for in-depth information on the constantly changing technology of communications.

As *Computerworld* expands its weekly news coverage of communications with interpretive information on products, equipment and services, *Computerworld On Communications* will complement that coverage with focused attention on the boarder issues facing business communications users.

*Computerworld On Communications* will keep readers current on changing trends in the design, acquisition, operation, and optimization of corporate communications facilities. It will look at communications and networks from a systems perspective that relates technical capabilities with corporate goals.

In the two issues for 1983, *Computerworld On Communications* will apply the proven editorial resources of *Computerworld* to the area of communications networks. It will look at the implications of enhanced communications within the business organization together with the impact on established systems operations.



So, if you're among the majority of *Computerworld* subscribers who are personally involved in the selection and implementation of communications equipment and services for their organization, you'll find *Computerworld On Communications* a valuable addition to the *Computerworld* family of special publications.

As a *Computerworld* subscriber, you will automatically receive the two 1983 issues of *Computerworld On Communications* as part of your subscription. If you're not already subscribing to *Computerworld*, call toll free 800-343-5730.

Remember to look for *Computerworld On Communications* on May 18th and again on September 28th (advertising deadlines April 8th and August 19th).

For advertising information on *Computerworld On Communications*, call Bill Dwyer, National Accounts Manager at (617) 879-0700 or your local *Computerworld* sales representative.

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## Experimental Switch Developed by IBM Employs Cryogenics

YORKTOWN HEIGHTS, N.Y. — Researchers at IBM's Thomas J. Watson Research Center here have developed a superconducting electronic device with a switching speed of about 300 psec.

Called the quiteron by its inventor, Sadeg M. Faris, the device employs a cryogenic process similar to that used in Josephson Junctions. In both devices, superconductivity — the phenomenon that certain materials lose virtually all resistance when cooled to near-absolute zero — plays a key role.

While still in the experimental stages, IBM said the quiteron can be used in circuit designs similar to ordinary transistors. The device has a switching speed of 300 psec and a power dissipation that is 1% that of semiconductor transistors on the market today.

In addition, the quiteron has demonstrated an ability to return to equilibrium after excitation. That means the quiteron is believed to be immune to a latching problem that has caused problems in some Complementary Metal Oxide Semiconductor technologies.

IBM said scientists should be able to scale the quiteron down to lateral dimensions of about 0.1 micrometers. That means the device is a candidate for use in high-circuit density applications.

The quiteron is a three-terminal superconducting device which, IBM said, can both amplify and switch. That gives the device the potential for applications in analog and digital circuits.

IBM also pointed out that the device's design and operation have yet to be optimized.

## Incorporates Winchester Disk IC-475 Disk Copier Announced

TUSTIN, Calif. — A system that copies 5¼-in. and 8-in. single-sided disks at initialization speed has been announced here by Applied Data Communications, Inc.

The IC-475, which incorporates a Winchester disk with the associated hardware, copies on one revolution, verifies on the next and steps on the third.

The system is reportedly capable of speeds of 25 seconds for a 5¼-in. single-sided disk and less than 40 seconds for an 8-in. single-sided disk, a vendor spokesman explained.

Using the phase-lock recovery, write compensation and read margin tech-

## MDS Bundles 'Express,' Targets Office Automation



The Express E300 System

By Lois Paul  
CW Staff

WALTHAM, Mass. — Two models of a decision support system machine — versions of its Express DSS bundled with a Prime Computer, Inc. 2250 minicomputer — were introduced here recently by Management Decision Systems, Inc. (MDS).

Called Express E300 and E600, the multiuser hardware/software systems are intended for use in office environments, outside of DP departments, according to the vendor. The firm considers them a lower cost means of introducing Express, which as a stand-alone package sells for up to \$300,000.

up to \$300,000.

Many users felt they had to start out with something cheaper and then work up, according to John S. Wurts, president of MDS. Justifying the outlay of up to \$300,000 for software was difficult for them. Therefore, the E300/600 systems are targeted directly at a single department within a large firm.

He noted that the systems can support a variety of terminals and peripheral devices and can be configured in a network using Prime's Primenet networking capability. The systems also can be linked to Prime 850 mainframes.

### 'Full Version' of Express DSS

Walter E. Lankau, vice-president of MDS, stressed that the software bundled in the E300/600 systems is a full version of the mainframe-oriented Express DSS, "not a watered down product." It includes an operator interface designed to allow it to be used by non-computer-oriented personnel, as well as computer-aided instruction to train new users, he explained.

Wurts indicated that the Express minicomputer-based systems are being pitted directly against the personal computers

(Continued on Page 50)

## Gifford Micro Supports CP/M

SAN LEANDRO, Calif. — Gifford Computer Systems, Inc. has announced an S-

100-based microcomputer that reportedly supports Digital Research, Inc.'s CP/M operating system and conforms to the IEEE 696 communications standard.

Based on the Motorola, Inc. 68000 microprocessor, Gifford's microcomputer system can directly access up to 16M bytes of main memory without segmentation registers, a spokesman said.

Standard features of the system include 256K bytes of main memory, nine serial ports, a 20-slot motherboard, a real-time clock/calendar and 2.4M bytes of removable mass storage, a spokesman for the vendor said.

Systems cost from \$5,345 for a single-user floppy-disk-based system to \$14,505 for a six-user system with a Winchester disk drive and 512K bytes of main memory.

Additional information is available from the vendor at 1922 Republic Ave., San Leandro, Calif. 94577.

## CW Wants Your CAM . . . Input

CAM, MRP and FMS are some of the hottest new topics in the world of computers. *Computerworld* wants to tell its readers more about computer-aided manufacturing, materials resource planning, flexible manufacturing systems, robotics and shop-floor control.

The April 25 issue of *Computerworld* will provide in-depth coverage of manufacturing in transition and the role computerized systems are playing. We are looking for articles on how the new manufacturing technologies fit together and what they all mean to DP operations in a manufacturing environment.

Industrywide tutorials on all aspects of computers and manufacturing are welcome. Other areas of interest include user experiences, application stories, studies, management strategies and psychological effects.

Articles should be between five and eight pages, double-spaced and typed. The deadline is March 18, but the sooner we get your manuscript, the better the chance it will be used.

Submit your stories to Bruce Hoard, *Computerworld* Editorial, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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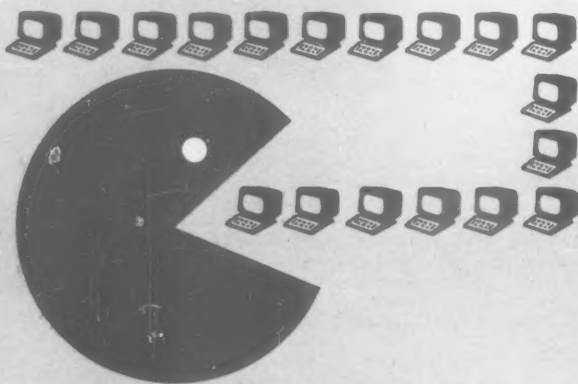
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### Micro-Based System

## Medical Manager Offered

MORRIS PLAINS, N.J. — A microcomputer-based medical practice management system that improves cash flow by expediting patient account and insurance claim tracking has been introduced by Monroe Systems for Business, a division of Litton Industries, Inc.

The Promed system, based on Monroe's Occupational Computer 8820, is backed by the firm's 350 U.S. service centers and support staff. Aimed at solo and small group practices, Promed features patient bill-

ing, budget plan status and patient recall functions.

The system is said to improve cash flow by expediting patient account and insurance claim tracking. The microcomputer with 128K bytes of random-access memory costs \$4,385; the 80-col., 120-char./sec dot matrix printer costs \$1,595; and the system software costs \$3,700, including instruction and installation.

The vendor is located at The American Road, Morris Plains, N.J. 07950.

## DEC Cuts LSI-11/23 Board, PDP-11/23 Plus Prices

MAYNARD, Mass. — Digital Equipment Corp. has announced price reductions of up to 36% for its LSI-11/23 CPU boards and up to 18% for its PDP-11/23 Plus packaged CPU assemblies.

Effective immediately, the new prices cover two board-level microcomputer products and four box-level assemblies. The cuts were made possible because of high-volume production of the units, according to the firm.

The price for the LSI-11/23 CPU board with memory management unit has been reduced from \$2,110 to \$1,340. Without a memory management unit, the price is reduced to \$1,140 from \$1,690.

The price of a PDP-11/23 Plus with 256K bytes of random-access memory (RAM) and a nine-slot backplane has been cut from \$6,950 to \$5,690 for both 120-Vac and 240-Vac models. A PDP-11/23 Plus CPU box with 512K bytes of RAM and a nine-

slot backplane has been cut from \$7,950 to \$6,690 for both 120-Vac and 240-Vac models.

DEC is headquartered at 146 Main St., Maynard, Mass. 01754.

## Feature Extends Alphaword III+

FAIRFIELD, N.J. — Compuscan, Inc. has announced a mark sense capability on its Alphaword III+ page reader.

The mark sense feature, often used to score multiple choice tests, can be used to enter data from a variety of documents. This information can then be sent to word and data processing systems, according to the vendor.

The Alphaword III+ costs \$29,500.

Compuscan is located at 81 Two Bridges Road, Fairfield, N.J. 07006.

## Adviser Series Gets Addition

MINNEAPOLIS — Computer Designed Systems, Inc. has announced a new product family within its Adviser Series of computers for the manufacturing, wholesale distribution and medical industries.

The basic Adviser Micro-Plus configuration includes a CRT terminal, 120 char./sec printer, 128K bytes of memory and two 5¼-in. floppy disk storage devices with optional upgrades, including Winchester capabilities.

The unit can communicate locally or remotely with larger computer systems made by the vendor. Base price of the system is \$5,000 from the firm at 10911 Olson Memorial Highway, Minneapolis, Minn. 55441.

## Daisywheel Printer Added to Sanyo Line

MOONACHIE, N.J. — Sanyo Business Systems Corp. has announced the addition of a 16 char./sec daisywheel printer to its line of computer peripherals.

Model PR5500 reportedly features an adjustable typing pitch, bidirectional printing and will handle 17-in.-wide paper.

It is compatible with most word processors and other computers offering a Centronics Data Computer Corp. parallel interface, according to the vendor.

This product has been priced at \$995, Sanyo Business Systems said from 51 Joseph St., Moonachie, N.J. 07074.

## HP Cuts Prices On Graphics Aid

PALO ALTO, Calif. — Hewlett-Packard Co. has cut prices on the graphics package for its HP 2680A laser printer by up to 21%, depending on options ordered.

U.S. list prices now range from \$16,115 to \$28,115, a savings of as much as \$7,500 over the old prices, according to a company spokesman.

The HP 2680A graphics package includes firmware, memory and graphics support software said to allow graphics to be output from non-HP sources as well as from the firm's HPdraw, HPeasychart and DSG/3000.

Price cuts also apply to the 45 page/min HP 2685 laser print station, now priced at \$164,500 with 128M-byte disk, a \$1,000 savings, the vendor said.

HP is headquartered at 3000 Hanover St., Palo Alto, Calif. 94304.



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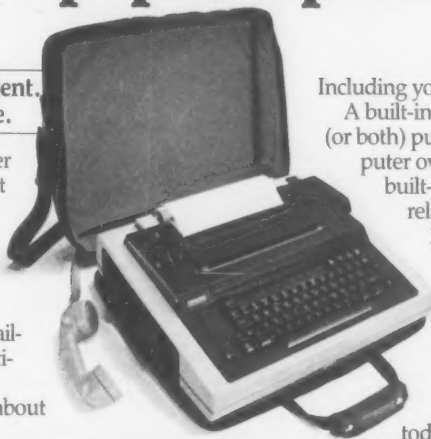
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## Features Expanded Storage

# Microfiche Recorder Updated

SAN DIEGO — A microfiche recorder with reportedly expanded storage and formatting capability beyond previous models has been announced by Datagraphix, Inc.

The Mini-Autocom Model

## MDS Offers DSS Models

(Continued from Page 47)

that many end users are bringing in to help them handle analysis of data. "As far as I am concerned, personal computers are absolutely outstanding for personal use," Wurts said, adding that the trouble occurs when they are brought into a corporation.

According to Wurts, Express, the software package, will run on the next generation of personal computers.

The E300/600 has 2M bytes of memory, expandable to 3M bytes, and 68M bytes of hard disk storage, which is expandable to 632M bytes. Both systems can support between 12 to 15 users. E300 can support three simultaneous users; E600 can handle six simultaneous users.

The E300/600 for finance was designed for financial reporting, analysis and modeling. It includes data base management capabilities, report and graphics features, a complete set of financial and statistical analyses and advanced modeling techniques.

The E300/600 for marketing supports applications such as sales planning, sales tracking and control, marketing mix analysis, strategic marketing planning, market evaluation and new product development. It includes report and graphics capabilities, marketing analysis features, including competitive comparisons, trend analyses, and pre- and post test analyses and modeling and forecast features.

The E300 system is priced at \$125,000; the E600 will sell for \$180,000. More information about the products is available from MDS, 200 Fifth Ave., Waltham, Mass. 02254.

It employs a 20M-byte Winchester disk for improved reliability and increased job setup capability. It converts computer-generated tapes into cut, dry nonreversal or optional reversal microfiche, ready for duplication.

The unit is said to accept virtually any print image or computer-output-microfiche formatted tape. Prices start at \$128,000, and the firm can be

reached through P.O. Box 82449, San Diego, Calif. 92138.

## Torch Slashes Micro Prices

WOBBURN, Mass. — Torch Computer Corp. slashed prices on the Torch micro from \$6,500 to \$4,995.

The cost of the hard disk version has also been reduced from \$10,000 to

PHOENIX — A multiuser, Digital Research, Inc. CP/M-compatible small business

\$7,995. The Torch systems reportedly offer a variety of communications capabilities.

Further details can be obtained from Torch headquarters at 61 Commerce Way, Woburn, Mass. 01801.

system has been announced by Thought Works, Inc.

The 8-bit Model TW-800 is expandable to 12 terminals and 20 printers. Options include 20M bytes of Winchester hard disk memory.

The system lists at \$9,275. A totally configured 10-user system can be delivered for about \$2,100/user, the firm said from 3532 W. Thomas Road, Phoenix, Ariz. 85109.



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## Supermouse Serves 8-, 16-Bit Systems

SUNNYVALE, Calif. — Televideo Systems, Inc. has announced Supermouse, an optical mouse for the firm's line of 8- and 16-bit systems.

Supermouse allows the user to manipulate stored data on a CRT terminal without using keyboard commands. By moving the mouse over a specially designed grid, the user reportedly can direct the cursor to any location on the screen.

It costs \$99, the vendor

said from 1170 Morse Ave., Sunnyvale, Calif. 94086.

## Memory Board Line Fits Wang VS CPUs

NEWTON, Mass. — EMC Corp. has announced a line of memory boards for Wang Laboratories, Inc. VS series processors.

Memory boards are available for Wang VS-50, VS-80, VS-90 and VS-100 processors. Capacities range from 128K

## Bits & Pieces

bytes for the VS-50 and VS-80 processors to 1M byte for the VS-90 and VS-100 processors, the vendor said.

The memory boards are hardware- and software-compatible with the Wang host processor, and no modifications are necessary to the host system, according to the company.

The memory boards cost from \$2,500 for a 128K-byte configuration for the VS-50

and VS-80 to \$8,900 for a 1M-byte configuration for a VA-90 and VS-100 system. The vendor is located at 385 Eliot St., Newton, Mass. 02164.

## UPS for Micros Boasts No-Break Power

ADDISON, Ill. — Instrumentation and Control Systems, Inc. has announced Lifeline, an uninterruptible power supply for microcomputers.

The unit features a no-break power feature that provides voltage regulation and line filtering. The unit also includes an inverter that provides power for up to 10 minutes during an outage, the vendor said.

Batteries can be 90% recharged in about 40 minutes, and larger batteries can extend backup power to about 40 minutes, the vendor said.

Available in 200 VA, 600 VA and 1,200 VA configurations, units are priced from \$1,042, the vendor said from 520 Interstate Road, Addison, Ill. 60101.

## Graph/Net Targets Integrated Design

CAMBRIDGE, Mass. — A computer integrated design system for architects, engineers, designers and facility planners has been introduced by Graphic Horizons, Inc.

Graph/Net includes interactive software for layout optimization, drafting, dynamic perspective simulation and data management; a computer with high-resolution screen and graphics processor; and a workstation.

The computer is from Three Rivers Computer Corp. of Pittsburgh, Pa., and includes 1M byte of memory, 24M bytes of Winchester disk, a 16-bit bit-sliced processor and a black-on-white graphics screen.

The system costs \$59,265 from the vendor at Box 312, Cambridge, Mass. 02238.

## Pro-Log's Developer For Buses Fits SP/M

MONTEREY, Calif. — Pro-Log Corp. has announced ABL-1, a general-purpose standard bus development system that is compatible with Digital Research, Inc.'s SP/M operating system. The system is designed for use as a software development tool or as an OEM target system.

The unit uses an 8-bit Zilog, Inc. Z80A microprocessor with 64K bytes of static random-access memory. Also included are two thin-line 8-in. floppy disk drives, offering up to 3.2M bytes of double-density storage, a single-density controller and two RS-232C ports.

Systems cost \$6,295 and will be available in March from 2411 Garden Road, Monterey, Calif. 93940.

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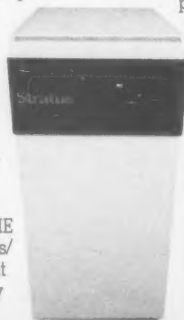
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## 'At Most, Adequate' Need for Quality Micro Software Seen

By Bruce Hoard  
CW Staff

"Even the best and most robust personal computer word processing software is, at most, adequate," Amy Wohl, president of Advanced Office Concepts Corp., said in a recent interview.

Wohl's comment underlines a basic problem facing the growing force of personal computer users as they apply their machines to production-oriented, office word processing: The quality hardware is here, but the quality software is not.

The situation could change in the near future. "Real" word processing software may soon be available because, as Wohl put it, "the market for personal computers in the business environment is now large enough that it makes sense to invest the money in writing good software."

There is certainly no lack of quantity when it comes to word processing packages for micros. A chart done by *Infoworld* newspaper lists no less than 43 packages available for major machines.

### Compromised Packages

According to Wohl, the problem is that packages are compromised, either in richness of function, meaning they lack depth of features, or in terms of the interface, meaning they are not user-friendly. She made it clear that even the best micro word processing package is at best comparable to an average dedicated word processor package.

Wohl warned against using low-cost proprietary packages such as those offered by Apple Computer, Inc. and Radio Shack, saying they are "not very good." They are basically designed for personal letter writing and not professional office applications, she noted.

Wohl said there are three specific areas to look for when acquiring word processing software for personal computers: training and documentation aids, adequate basic function, ease of use and appropriateness for desired applications.

There should be training help in the form of a menu backed by tutorial soft-

ware. Adequate basic function includes such items as convenient insertion, deletion and rearrangement of text. For instance, users should check to see if it is necessary to use three keystrokes or one to perform a basic and frequently used function.

### Oasys Users Get Enhancements, IBM Link, Printer

BOULDER, Colo. — NBI, Inc. has introduced two IBM 3270 communications products, a laser printer and software enhancements for its family of office automation products.

The Office Automation System (Oasys) product family will now be able to communicate interactively with IBM mainframe computers by emulating IBM's 3270 products series. IBM 3270 Binary Synchronous Communications (BSC) is available for the Oasys 3000/S for \$900, and 3270 Systems Network Architecture/Synchronous Data Link Control for the Oasys 64 series, which will be available in September, costs \$2,500, plus \$500 for the software license fee.

The Oasys Laser for the Oasys 64 offers printing speeds of 12 page/min and can use up to four different type fonts on one page. It will be available in July for \$19,900, plus an Oasys 64 interface for \$1,500.

Among the software enhancements now available are a spelling-error detection and correction package for the Oasys 64 for \$900. An electronic bulletin board for the Oasys 8 and Oasys 64 requires the asynchronous/BSC option, which is priced at \$2,500.

More information on these products is available from NBI through P.O. Box 9001, Boulder, Colo. 80301.

Most micro packages are also limited in their ability to handle lengthy, over 10-page, documents, Wohl pointed out. "You need more help when you're editing long documents," she said. "You want the system to do more of that work for you."

Separate packages for text editing and list processing is another problem. She commented that handling a name and address list merged with a letter becomes "fairly complex."

The office automation consultant uses Wordstar from Micropro International Corp. on her IBM Personal Computer and Xerox Corp. 820 micro. She was hesitant to say it is the best product, stating only that it is the most appropriate for her individual needs.

Wordstar runs on personal computers from IBM, North Star Computers, Inc., Zenith Data Systems, Inc. and Apple using the CP/M operating system from Digital Research, Inc. Wohl put the package in perspective by saying that even though it is among the best for micros, it was designed to handle only a limited set of office applications.

A new Wordstar user requires between half a day and a full day to learn how to get on the system, write a document and print it out. However, to become skilled with the package, it takes "at least several weeks of fairly extensive use, and you would probably want to use the system for a period after that to practice," she said.

Users should be prepared to pay around \$200 for a good package under most circumstances. Volume buyers of the Xerox 820 may be able to obtain the software for around \$5/edition, but Wohl detailed the potential danger in the volume approach.

A hardware vendor may go to a successful software vendor and buy 100,000 copies of a word processing package at \$5/copy. The hardware vendor then passes the \$5 cost on to the buyer through an increased hardware price.

"But in order for that to happen, they have to find a software package where it makes sense for the software vendor to make the deal," Wohl declared.

"May I point out to you that the better the package, the less incentive the software vendor has to make that kind of a deal," she said.

## Workstation, 46M-Byte Winnie Bow for Hinet Local-Area Net

OAKLAND, Calif. — Digital Microsystems has unwrapped two enhancements for its Hinet local-area network: an integrated Zilog, Inc. Z80-based workstation with a 12-in. CRT and a 46M-byte Winchester master station.

The DMS-1280 workstation reportedly offers a detachable keyboard, 64K bytes of random-access memory, a 500K bit/sec RS-422 network port and a 9,600 bit/sec RS-232 printer port. The DMS-3/103 46M-byte master station is said to double the

available formatted Winchester disk capacity.

Hinet is a packet-switched network based on the Digital Research, Inc. CP/M operating system and said to provide 500K bit/sec serial data transmission with the IBM Synchronous Data Link Control protocol.

The DMS-1280 workstation is available for \$1,695; the DMS-3/103 master station costs \$11,990 from Digital Microsystems, 1755 Embarcadero, Oakland, Calif. 94606.

## DEC Dot Matrix Printer Debuts

MAYNARD, Mass. — Digital Equipment Corp. has introduced a dot matrix printer for its Rainbow 100, Decmate II and Professional 300 series of personal computers.

The Letterprinter 100 is said to feature letter-quality characters, bit-map output, standard tractors and integral multifont capability.

The printer operates at 240 char./sec in draft mode and 30 char./sec in letter-quality

mode, a vendor spokesman said.

When in graphics mode, printing densities range from 133 by 72 dot/in. to 330 by 72 dot/in., depending on terminal aspect ratio desired, the vendor spokesman said.

The Letterprinter 100 printer is priced at \$2,690.

Additional information on the unit can be obtained from DEC, located at 146 Main St., Maynard, Mass. 01754.

### Fax Transceivers Announced

MOONACHIE, N.J. — Sanyo Business Systems Corp. has introduced two facsimile transceivers.

The digital Sanfax (SF) 825 is said to be compatible with all other facsimile machines and able to transmit documents in as little as 20 seconds.

The SF 825 features automatic answer, automatic speed/mode selection and automatic paper cutting.

The SF 355 analog unit — for low-volume users — is compatible with CCITT Groups I, II and six-minute standards.

The SF 825 costs \$7,500, plus a \$100 installation fee and \$600/year for service. Monthly rentals are \$220 on a three-year lease, including service and maintenance.

The SF 355 costs \$4,500 with the same installation and service charges. Rental on a three-year lease costs \$125/mo, according to the vendor.

Sanyo Business Systems is located at 51 Joseph St., Moonachie, N.J. 07074.



# "AS MICROS INVADE THE CORPORATE ENVIRONMENT— ARE YOUR STRATEGIES IN PLACE?"

The microcomputer has burst onto the corporate landscape and into the professional DP environment with a vengeance. How prepared are you to give your users the help they need? This March 28, *Computerworld* will run a first-time special report on Micros in Big Business.

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*Computerworld* readers have been active participants in the changes being wrought by the increasing use of microcomputers. In the past three years, according to our reader research, the number of readers' organizations using microcomputers has grown from 8% to 62%. That's a compound annual growth rate of 97.9%!!!

More than 162,300 *Computerworld* readers say they are directly involved in purchasing micros for their organizations. More than 112,900 *Computerworld* readers are involved in buying microcomputer software for their companies. And of the users who subscribe to

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- how to integrate micro operating systems with mainframes
- portable computing

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In addition to the tutorials and applications stories on integrating micros, you'll read a round-up story on the top ten microcomputer manufacturers, a key story on what kinds of

software work best in integrating micros into the corporate environment, a close look at costs involved — and — a survey article on the numbers: What's currently installed and who's got the most machines out there. This article will be based on the most current desktop computer research from International Data Corporation, the world's largest computer industry research firm.

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## R&D Center Helps Forge New Heritage

By Bill Laberis  
CW Staff

SCHENECTADY, N.Y. — Parallel rows of towering elms, few of which remain in the Northeast, line the main entrance to General Electric Co.'s Research and Development Center. The trees have been carefully preserved and stand as one of several other reminders of GE's past here, where the company began nearly a century ago.

But inside the sprawling complex, 2,100 workers, including 450 Ph.D. holders, labor on futuristic projects. Many projects support new GE businesses or others not yet in the company fold — businesses that have little in common with the company's smokstack heritage.

GE is, in fact, a \$30 billion, broadly diversified conglomerate undergoing a strategic metamorphosis (see story right). The company's ongoing portfolio changes have a distinct high-technology flavor, and a glimmer of future directions and corporate strategies can be seen in some of the re-

(Continued on Page 56)

## GE Looks to High Tech What to Do With \$5 Billion?

By Bill Laberis  
CW Staff

What will General Electric Co. do with its \$5 billion cash hoard, a strong penchant for acquiring high-technology companies and, in the words of its chairman, a goal of becoming positioned at the leading edge of high-technology products?

One thing appears likely: despite some recent speculation, GE will probably not get back into the mainframe computer business it hastily abandoned in 1971. Said one industry analyst, "GE blew a golden opportunity in that market and is not about to risk getting burned all over again."

But the company's acquisition and start-up record in the past two years and the recent pronouncements of GE Chairman John F. Welch Jr. clearly indicate that GE is moving away from its traditional business toward diversification with a high-technology accent.

As one GE executive said, "People came to look at us as a balance-sheet, stodgy and conservative kind of behemoth, especially when we dumped the computer business. The direc-



GE's R&D Center

tions we're going in now, such as in software, microprocessor development and factory automation, will bear this out beyond a doubt."

Interest in GE's acquisition direction was heightened last month, when the company announced intentions to shed its Utah International, Inc. mining operation for \$2.4 billion in cash. This, combined with another \$2.6 billion in cash and marketable securities on hand at the end of 1982, will give GE a huge sum to fatten and diversify its portfolio of the 225-plus

businesses it controls.

Since 1981, GE has spent \$1 billion to purchase partial or total interest in 117 companies. Meanwhile, the company shed 71 businesses, mostly in heavy industry, netting \$541 million, the executive said.

Outright acquisitions included Calma Corp., a computer-aided design and manufacturing firm, for \$170 million, and Intersil Microelectronics, Inc., a microchip maker, for \$235 million.

General Electric Information Services Co. (Geisco), GE's processing service subsidiary, at the same time has gobbled up several software companies, including Software International Corp.

"There's no question (that) GE's long-term orientation is to get into, or I should say back into, the high-tech business," said Michael Geran, an analyst with E.F. Hutton & Co.

Geran, who said GE "knows it made a big mistake in getting out of the computer business," speculated that the company will be "very niche-oriented." He said he looks for further software acquisitions, largely to support an expansion of Geisco's offerings, as well as invest-

(Continued on Page 56)

## R&D Called Chip Makers' Lifeblood

By Robert Batt

CW West Coast Bureau

If research and development is the lifeblood of an industry, then for many semiconductor manufacturers the next few years will result in either a resurgence in health or a relapse from which recovery will be very difficult.

With the industry suffering from squeezed profit margins due to a prolonged recession and with the costs of R&D steadily increasing, several industry observers feel the chip producers will have to come up with more effective ways of funding product innovations.

"Technology is becoming ever more complex. As a result,

research itself and cost of equipment and instruments necessary to carry out research are increasing tremendously," explained Erich Bloch, vice-president, technology personnel development at IBM.

Bloch, who is also chairman of the Semiconductor Research Cooperative (SRC), a subsidiary of the Semiconductor Industry Association, asserted that manufacturers will be drawn increasingly more into cooperative efforts as the cost of R&D becomes too burdensome for a company to bear alone.

The purpose of the SRC is to increase the level of research in the semiconductor industry by

(Continued on Page 60)



CW Photo by B. Laberis

Erich Bloch

## HP Reorganizes Operations

PALO ALTO, Calif. — In a move designed to strengthen channels of customer interaction and improve strategic focus for its computer operations, Hewlett-Packard Co. has reorganized computer activities along lines reflecting five principal responsibilities.

HP's five groups include:

- Computer Products, responsible for development and manufacture of CPUs, operating software, languages and advanced microcircuitry.

- Information Products, responsible for development and manufacture of system peripherals, data communications products, data base resources, print centers and the software to combine these with systems

and workstations to form information networks.

- Personal Computer, responsible for development and manufacture of workstations, personal computers and various other personal computation products.

- Computer Marketing, responsible for sales, field marketing, maintenance services and applications support for all HP computer products in all markets.

- Business Development, responsible for market development and merchandising of HP systems, workstations, networks and applications software as a set of solution systems for each of the company's major markets.

## Vendor Eyes 'Steals' at Show, Finds own Stolen Hardware

By Jeffery Beeler

CW West Coast Bureau

SAN FRANCISCO — An estimated \$14,000 worth of stolen hardware unexpectedly resurfaced here late last month when its owner happened to notice the equipment on display in a competitor's trade-show booth.

The hardware had vanished from Hawthorne, Calif.-based Jade Computer Products, Inc. nine months ago only to reappear suddenly in a product exhibit at Digital Research, Inc.'s first CP/M '83 conference.

The exhibit belonged to a local firm, Itat Associates, Inc., which on Jan. 21-23 was showcasing its wares practically in the shadow of another product booth rented by Jade, also an

exhibitor at the same show.

After spotting his company's stolen goods late during the final day of the conference, Jade owner Scott Anderson called local police, who briefly detained Itat chief Willis Lowe and seized \$14,000 worth of Itat-displayed hardware.

Lowe was later released after he furnished police with receipts showing his firm had bought at least some of the equipment in question from a local distributor known as the Alfred Gee Liquidation Co. Although police are continuing to investigate the case, no charges have yet been filed against Lowe or any of his Itat associates.

(Continued on Page 62)

COMPUTER INDUSTRY

# GE Forges Diversified Future From Tradition

(Continued from Page 55)  
search carried out at the R&D center.

Of the 917 patents granted to GE in 1981, 227 originated at the R&D center (compared with 504 companywide at IBM). And of the company's \$1.7 billion research budget in 1982, approximately \$180 million supported center activities, a figure increasing rapidly, according to a company spokesman.

Last October, GE completed a three-year, \$130 million expansion program at the R&D center, adding 440,000 square feet to its existing fa-

cilities. Included in this expansion was a microelectronics unit and computer science laboratory. According to James F. Welch Jr., GE's chairman, the microchip research facility was designed to "let us apply the tremendous potential of the microelectronic chip to every possible product, service and process, including the advanced automation systems needed to revitalize U.S. industry."

Kirby G. Vosburgh, manager of the silicon processing laboratory at the center, said of the company's chip R&D

efforts, "GE had been on a buy vs. a build path for the last 10 years. Now with what we're doing here, we'll turn that around."

Most of the research conducted in the laboratory will support the work of Intersil, Inc., the microchip maker acquired by GE in 1981 for \$235 million.

Vosburgh said that GE is not destined to compete with other chip makers in the low-end chip market, noting that, "GE is a systems company, so we try to sell systems of high margins rather than components of low margins." He suggested that GE will likely strive to transfer chip technology into embedded systems in its product and service offerings.

Philip M. Lewis, manager of the center's computer science branch, agreed with Vosburgh, saying that GE will concentrate its chip research energies on making special-purpose chips "with huge capabilities" and specific applications in robotics and computer-aided design.

Arthur Chen, manager of the center's information systems laboratory, said there has been a significant push within his group to develop industrial applications of artificial intelligence (AI). His laboratory is also experimenting with the use of AI

as a training tool.

Chen said that about 35% of the work done in the information systems laboratory is pure or exploratory research, such as in formulat-

ing a high-level, functional language for VLSI-based systems or in experimentation to devise fully integrated local networks for voice, data and video communications.

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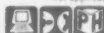
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## Where Is GE Going?

(Continued from Page 55)

ments to strengthen its position in communications and intelligent robots.

But as to the possible acquisition of a mainframe, Geran said, "It is very clear this will not happen."

Jack Hart, industry analyst at International Data Corp., said that GE will not be in the market for a mainframe manufacturer acquisition.

Hart guessed that GE will concentrate a portion of its cash hoard on telecommunications acquisitions, but speculated further that the company could possibly jump into the already-crowded personal computer market.

"GE has fabulous distribution channels for that sort of thing already in place," Hart said.

In the meantime, no one, including GE, is ruling out the possibility of a major multibillion dollar acquisition.

"We want to be number one or two in each of our worldwide businesses," a GE spokesman said, echoing the sentiments of Chairman Welch.

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# IBM Seen Narrowing Competitors' Horizons

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — IBM's increased market aggressiveness is forcing noncompatible competitors to narrow their market horizons, with many of them now adopting a bunker mentality.

This is the dominant view of several industry analysts interviewed recently. The market domination of IBM, they claimed, means there are very few companies with the resources to compete with Big Blue except in a few selected areas.

According to industry sources, IBM's recent rampage to gain market advantage will force many of its competitors to choose more narrowly than they might have which sector of the industry they want to tackle and to concentrate on gaining a market share in that area.

"To compete successfully in an increasingly tough industry, companies will need a good installed base in one area or another, understand to what extent they are mature organizations or not and look to the future to see what products they need to have in place," said Dan Rubin, management consultant at SRI International, Inc.

## Noncompatible Vendors

Nowhere, the analysts asserted, has this become more apparent than in the increasingly rough-and-tumble world of non-IBM-compatible vendors such as Burroughs Corp., Honeywell, Inc. and Sperry Univac.

"These companies cannot challenge the resources of IBM when it comes to marketing across the board. They just don't have the muscle to do it and so they are gravitating toward some kind of niche strategy, and in that niche they can still be strong," explained Frank Petro, vice-president of information technology at Arthur D. Little, Inc.

For example, he suggested, Burroughs may concentrate on the banking sector, where it has traditionally enjoyed a competitive advantage.

The problem, Petro said, is that a number of users have switched to IBM from non-IBM-compatible vendors in order to ensure software compatibility of their products.

According to Gene Amdahl, chairman of Trilogy Systems Corp., companies such as Burroughs and Honeywell cannot compete against IBM's marketing channels. Their only chance of success, he asserted, is to develop technology to such an extent that it is too expensive for users to switch to IBM. "The user community can clearly see IBM pumping products into the marketplace at a rate that cannot possibly be matched by other non-plug-compatible mainframe suppliers. Up until now we have had one big monopoly and a set of minimonopolies. The strategy of companies such as Burroughs and Honeywell is to lock their users in economically. They will fight desperately against architectural compatibility of their products because then users would have no reason to stay with them," he added.

However, the industry consensus

is that, while facing an uphill struggle, IBM's noncompatible competitors have some factors in their favor.

Joseph Francini, president of Information Solutions, Inc. and a former vice-president at Litton Industries, sees the users' need for stability as a major plus in competing against a more rugged IBM.

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# STC Earnings Show Decline of 21% Over 1981

LOUISVILLE, Colo. — Citing the cost of field repair work to correct disk drive problems, Storage Technology Corp. (STC) has reported lower earnings of \$64.7 million or \$1.88 per share for 1982, a decline of 21% over 1981's earnings. Earnings in the fourth quarter plummeted 75%

to \$8.1 million or 25 cents per share.

Revenues for the year were up 17% to \$1.07 billion, compared with \$921 million in 1981, while revenues in the fourth quarter were up 1% over the same period a year before.

According to Jesse I. Aweida, STC chairman, the company "experi-

enced field problems with certain disk data storage products... involving the replacement of major subassemblies in certain drives." The cost of replacement and reworking was

more than \$17 million.

Aweida added that the 8380 disk drive, designed to compete with the IBM 3380, is under final test with initial shipments to begin in March.

## Chip Makers' Future Seen Dependent on R&D Funding

(Continued from Page 55)

stimulating and sponsoring R&D efforts in universities. But, according to Bloch, private industry alone cannot generate the funds needed to finance developments in semiconductor technology.

"The industry has been severely underfunded, and federal cutbacks in research and development are something we can ill afford. There is a strong case to be made for more government funding in science and technology research," he added.

In the meantime, chip manufacturers are exploring a variety of ways in which they can get more value out of their R&D dollars. At Advanced Micro Devices, Inc. (AMD), for example, the company has entered into a 10-year cross-licensing arrangement with Intel Corp. in which both companies gain access to certain sections of the other's technology and act as a second source to each other's products in those areas.

AMD last year spent about 16% of annual revenues on R&D. This year that figure is expected to grow to 18%.

"The lifeblood of our company is its products," an AMD spokesman said. "At the same time, the [product] life cycle is shorter than it once was. The days when you could introduce a product and have the market to yourself for 18 months are gone."

AMD and nine other companies have formed the Microelectronics and Computer Technology Corp. Its purpose is to give the participants more research ammunition to battle the semiconductor market threat posed by the Japanese.

But in a recent speech to the Semiconductor Equipment Manufacturers Institute, Glenn Penisten, chief executive officer of American Microsystems, Inc., asserted: "Investments like those made by the UK government in Inmos, Exxon Corp. in Zilog, Inc., UTC in Mostek Corp., Schlumberger in Fairchild Camera and Instrument Corp. and Philips, N.V. with Signetics Corp. probably won't continue."

At the same time, the capital-intensive nature of the semiconductor business makes it imperative that chip manufacturers have access to what Charles Lecht, president of Lecht Sciences, Inc., called a "significant, built-in and collaborating marketplace for their output." IBM's recent purchase of 12% of Intel's stock is an example of such an effort, he said.

Given recent industry initiatives, it is clear that several companies are striving to enlist such collaboration. According to Bill O'Neill, electronics consultant at Arthur D. Little, Inc. in

San Francisco, "While giants like Intel, Motorola, Inc. and Texas Instruments, Inc. will remain, there may well be a shakeout of the smaller guys."

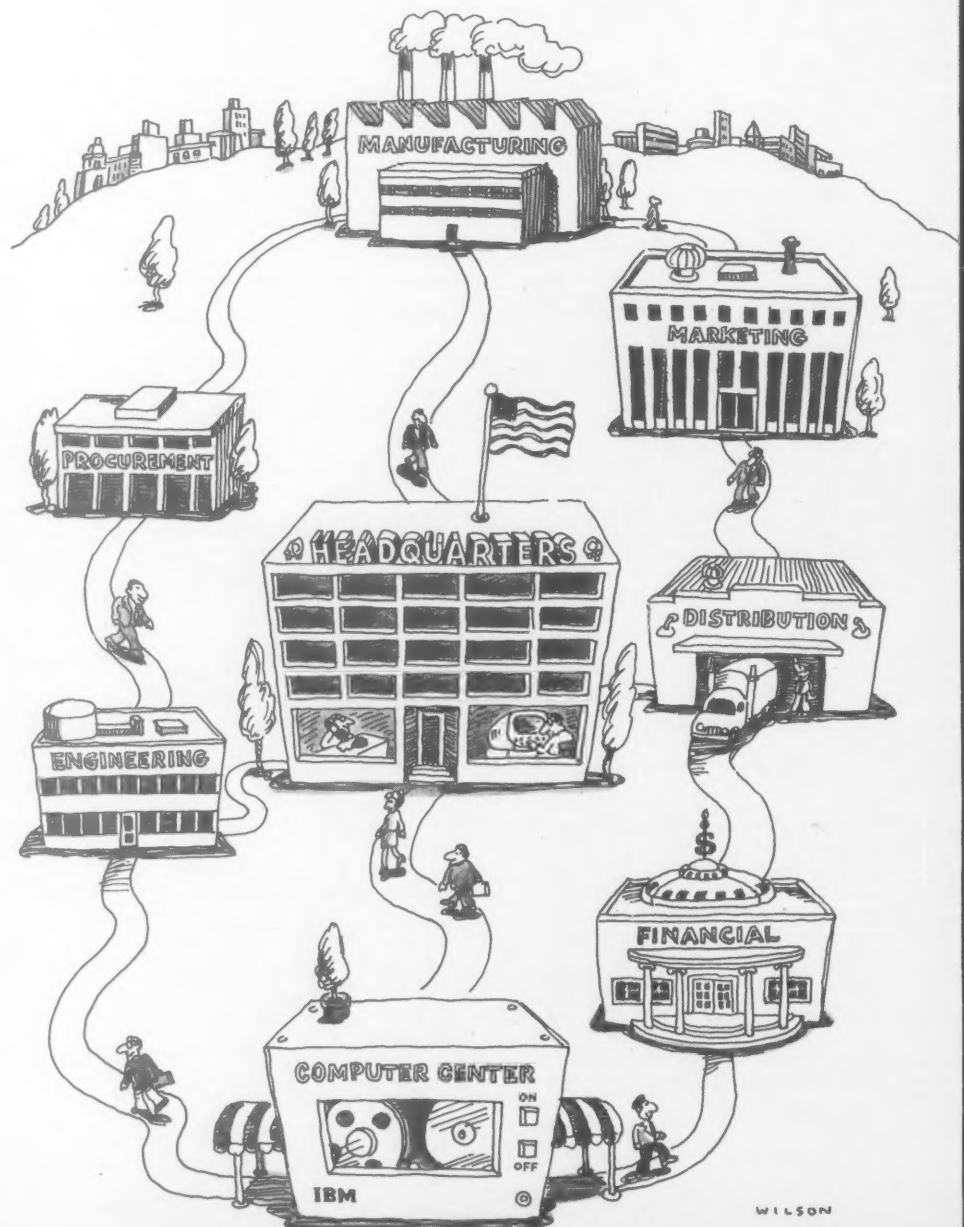
## AMS Settles ADL/Delphi Suit

ARLINGTON, Va. — American Management Systems, Inc. (AMS) announced it has settled litigation between itself and Arthur D. Little, Inc. (ADL) and ADL's second-tier subsidiary, Delphi Associates, Inc., and will pay Delphi \$700,000 upon formal dismissal of the suit.

The litigation, initiated in 1979, arose out of a project that Delphi was to perform for the state of Illinois,

with AMS working as a subcontractor. Originally, AMS had sought \$5 million in claims against ADL and Delphi, while Delphi filed a \$7 million counterclaim against AMS, according to AMS.

But a U.S. magistrate issued a memorandum several months ago containing recommendations against AMS's claim in favor of Delphi, AMS said.



## DP Industry Seeks Exemption

# GAO: Repeal Service Contract Act

WASHINGTON, D.C. — The General Accounting Office (GAO) has recommended that Congress repeal the Service Contract Act, a law in which minimum wage provisions for federal contractors has long been opposed by the DP industry.

Providers of federal DP and equipment maintenance services have been seeking an exemption from the act, originally intended to protect blue-collar workers from wage-busting practices of employers seeking government contracts. The exemption, proposed by the U.S. Department of Labor in late 1981, has been delayed but is near finalization, according to the Computer and Busi-

ness Equipment Manufacturers Association, which has led the fight against the law.

Looking at the act in its entirety, the GAO concluded Congress should consider repealing it because the

government has not been able to administer it effectively, the wage rates set under it are generally inflationary and, in the GAO's view, other laws and regulations already adequately protect services workers.

## Cray Posts 5% Earnings Increase

MINNEAPOLIS — Cray Research, Inc. announced a 5% earnings increase for 1982, finishing the year with profits of \$19 million or \$1.38 per share, up from \$18.2 million in 1981. Revenues for the year were up 39% to \$141 million. Fourth-quarter earnings were up nearly 50% to \$12 million, or 87 cents per share, and

revenues for the quarter rose 52% to \$62.7 million.

John A. Rollwagen, company chairman, attributed the sluggish growth to several factors, including a decision to reduce the price of the Cray 1/S computer, as well as higher than anticipated engineering and development costs of the Cray-2.

## TI Earnings Up 33% in '82, Revenues Up 3%

DALLAS — Texas Instruments, Inc. has reported a 33% gain in profits for 1982, with earnings rising to \$144 million or \$6.10 per share. Revenues for the year were up 3% to \$4.3 billion, a gain the company attributed to increases in sales of government electronics and home computers.

As a result of research and development credits taken in accordance with the Economic Recovery Act of 1981, the company's effective tax rate was down nearly 6% to 32.4%, a spokesman said.

TI also reported fourth-quarter earnings of \$42.6 million or \$1.80 per share, up 16% from the same quarter in 1981, and fourth-quarter revenues of \$1.1 billion, up 6%.

Revenues from semiconductor sales were essentially flat for the year, despite increases in unit sales, reflecting the stiff international price competition in that area. The semiconductor market, TI officials said, continues to suffer from excess capacity, sluggish demand and price erosion.

## Motorola Nets Revenue Gain

SCHAUMBURG, Ill. — The financial results in 1982 at Motorola, Inc. were similar to those at many other companies operating in virtually all segments of the computer industry: revenues up, profits down.

Annual earnings were pegged at \$169 million or \$4.64 per share, a 7% decline compared with 1981's \$182 earnings mark. Revenues meanwhile rose 6% to \$3.79 billion. Both earnings and revenues were up in the fourth quarter of 1982, the company reported.

Robert W. Galvin, chairman and chief executive officer, said that despite "a worldwide economic environment that continued to be difficult," the company was "able to nurture technological leadership."

Motorola's Semiconductor Products, Inc. reported level sales and declining profits, not unlike the results posted by the company's competitors throughout the semiconductor industry.

## MSA Revenues Hit \$101 Million in '82

ATLANTA — Management Science America, Inc. (MSA) has announced that its 1982 revenues topped the \$100 million mark, reaching \$101 million, a 38% increase over 1981's results. Earnings for the year increased 63% to nearly \$9 million, or 62 cents per share.

MSA's pretax income showed an increase of 40%, with net income increasing more sharply due to a substantially lower tax rate, the result of investment tax credits and tax deferrals.

John P. Imlay Jr., company chairman and chief executive officer, said MSA's results surpassed projections, with the bulk of revenues and profits realized in the fourth quarter.

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**XEROX**

## Administration Backed at Gatt Hearing

# Brock Launches Defense of Open Trade Policy

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — In the face of gathering protectionist sentiment in Congress, U.S. Ambassador William E. Brock recently went to Capitol Hill to launch the Reagan administration's defense of the 35-year-old American commitment to open international trade.

The occasion was a recent Senate Finance Committee hearing on U.S. participation in the General Agreement on Tariffs and Trade (Gatt), the 88-nation pact governing much of the world's commercial exchanges.

Gatt has been the object of heightened criticism in official U.S. circles since a November high-level Gatt meeting gave only lukewarm approval to an American plea to its trading partners to reemphasize their commitment to free trade and to refrain from imposing further trade barriers [CW, Nov. 22, Dec. 6].

### Open Trade Defended

Despite the assault on U.S. industrial competitiveness worldwide, the Reagan White House remains a firm defender of open trade. Brock urged Congress to disregard American "Cassandras" who would prescribe increased U.S. trade barriers to correct the problems of various American industries, such as auto manufacturing, suffering from competition from foreign imports.

The U.S. electronics industry in general supports the position of Brock, the chief White House advisor and spokesman on trade issues. The industry would like the administration to fight harder to reduce barriers overseas, particularly in Japan, to American imports. Industry spokesman have further expressed fears that American protectionist measures designed to bolster other U.S. industries would lead to increased barriers abroad to high-technology trade.

### 'A Beginning'

Referring specifically to high-technology and services trade, Brock acknowledged that the U.S. has had little success in introducing these important trade matters into the Gatt deliberations, which have so far been confined to trade in goods. But, he noted, the Gatt membership has agreed to take up services and high-technology trade, at least in a limited manner, which he described as "a beginning."

Warning against a "fortress mentality" that would lead to increased American protectionism, Brock said "the reality" is that U.S. commitment to free trade since World War II has made us economically much stronger and is "essential to our continued growth and strength."

"Trade policy has become the scapegoat for economic ills, not just

in the United States but worldwide," he said. "Despite the outcry for protectionism in this country, our economic and trade data reveal that the [U.S.] has generally performed as well as our major industrial trading partners."

"Nations which protect their

economies from adjustment today will pay by a decline in productivity tomorrow," he said. "Inevitably this means less economic growth, fewer jobs, a lower standard of living and more government intervention to divide up an even smaller economic pie."

## Stolen Hardware Surfaces

(Continued from Page 55)

Not even Itat seriously disputes Anderson's claim that the property seized during the CP/M show was part of a \$100,000 stockpile of equipment swiped last April from Jade's nearby Sunnyvale, Calif., office. The uncertainty arises over the question of whether Itat knew the hardware was stolen when the company bought it.

Itat denies ever having had any advance knowledge that the merchandise in its trade-show exhibit was loot from Jade's burglary. "We paid good money for that equipment and were selling it for a good price at a booth directly opposite from Jade's," according to Itat's attorney Alexander Anolik.

"I think it's highly unlikely we would have been so open about it if we had known the products were stolen," he said.

Local law enforcement authorities are unlikely to file charges against

Lowe and his company unless Jade produces serial numbers showing that the goods in Itat's booth were among the items taken in last April's burglary. Jade has repeatedly indicated its willingness to make such serial numbers available, but thus far has failed to do so, according to local police Inspector Michael Wilcox.

Itat, meanwhile, has threatened civil action against both Jade and Alfred Gee, although litigation at this point is by no means a certainty, Anolik said.

Asked to comment on the recent developments involving Itat, Jade's Anderson expressed satisfaction and mild surprise that part of his company's stolen property was finally recovered. The loot, which is still in the hands of local police, includes random-access memory boards, Xerox Corp. processors and Novation, Inc. modems as well as Shugart Associates, Inc. Model 801 and 851 disk systems.

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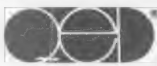


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<b>Structured Programming: Techniques for Productivity</b> March 1-4 ..... Texas April 5-9 ..... Boston May 10-13 ..... Boston June 7-10 ..... Philadelphia	<b>Teleprocessing Network Design</b> March 28-31 ..... Boston April 25-28 ..... Philadelphia
<b>Designing Systems Controls</b> March 28-30 ..... Boston	<b>CICS Command Level Programming</b> March 14-18 ..... New Jersey April 11-15 ..... Boston May 16-20 ..... Texas
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<b>Project Management and Control</b> March 16-18 ..... Boston May 24-26 ..... Seattle May 31-June 2 ..... Boston June 13-15 ..... New Jersey June 14-16 ..... Boston	<b>Writing with POWER for DP Professionals</b> April 4-5 ..... Boston March 24-25 ..... New Jersey May 18-19 ..... Philadelphia
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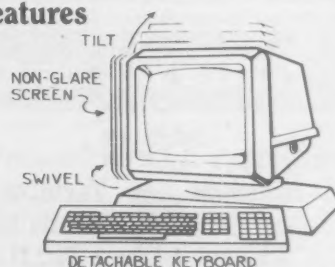
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## And More Options

# IBMer Says Micro Users Want 3270 Emulation

By Bruce Hoard  
CW Staff

ARMONK, N.Y. — Large-account IBM Personal Computer users want IBM 3270 CRT terminal emulation. And there is "a lot of demand" for the Personal Computer to replace the 3270, according to Patrick Zilvitis, manager of Personal Computer marketing with IBM's National Accounts Division. Zilvitis, whose division

has responsibility for any customer buying more than 20 Personal Computers, discussed in a recent interview what Personal Computer users want, who the users are and how software is marketed for the micro.

There are three marketing channels for the Personal Computer, he said: authorized dealers such as Computerland, IBM product centers and the National Accounts

Division, headed up by Zilvitis and catering to high-volume customers.

### Users Want 3270 Emulation

IBM 3270 emulation is one of the most common requests made by high-volume users, he said. IBM is currently shipping a Synchronous Data Link Control (SDLC) card with 3270 emulation that allows the micro to "look" like a Systems Network Architecture (SNA)-compatible 3270 on-line and a Personal Computer offline, he commented.

IBM recently introduced a Binary Synchronous Communications (BSC) protocol emulation for the micro to facilitate the huge installed

base of BSC users.

Why was SDLC introduced first when there are so many BSC users? "I don't have a good answer for you," he said, adding that IBM is promoting SNA/SDLC because its user base is growing more rapidly than BSC's.

Lack of options is what Zilvitis construes as the Personal Computer's main weakness. "I would say the weaknesses, in a way, are really a set of product requirements," he stated, adding that users want an IBM-logic color monitor, a hard disk, higher resolution color and a letter-quality printer, none of which is currently available from the vendor.

At first, IBM angered in-

dependent software houses by refusing to let them accumulate over \$100,000 in royalties for their packages. The vendor subsequently reversed that policy and Zilvitis estimated there are thousands of packages available.

They break down into "logoed" and "nonlogoed" products. Logoed software, such as Visicorp's Visicalc, has achieved "a high degree of acceptance" at IBM, he said, noting that there are about 50 logoed products.

"We have an applications software organization, which is really a business unit of IBM that has started to acquire nonlogoed software and make it available

(Continued on Page 66)

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Sevco, Inc. has donated a complete computer laboratory for student training to Marian High School of Framingham, Mass. A free lifetime service contract will be provided by Cosmic Enterprises, a Sevco affiliate.

Micro Peripherals, Inc. will market 3-in. flexible floppy disk drives to OEMs, becoming the first U.S. company to do so, according to company Chairman Ralph Gabai.

Digital Equipment Corp. has signed an agreement with Polygon Associates, Inc. of St. Louis to market and distribute Polygon's communications software, Poly-XFR, a file-transfer package that allows DEC's CP/M-based personal computers to communicate with other DEC computer systems and with non-DEC personal computers.

Advanced Computer Management Corp. has become a distributor

of Harris Data Service, Inc.'s financial applications software packages designed for the IBM System/34 and System/38.

Vector Graphics, Inc. has signed agreements to distribute Taurus Software's CP and Innovative Software's TIM III through its network of more than 450 independent dealers.

Hewlett-Packard Co. and Lexico Enterprises, Inc. have reached an agreement whereby Lexico will provide support and potential future enhancement for HP's Testaid/Fastrace software product. Lexico has been granted exclusive rights in the U.S. to offer Testaid/Fastrace training and has initiated expanded support services.

Digital Research, Inc. is sponsoring its first computer conference Jan. 21-23 at the Moscone Center in San Francisco for suppliers of software, hardware and related services for its standard CP/M operating systems. The three-day show will feature workshops, panels and seminars covering venture capital, software marketing and distribution, the future of microcomputer software and trends in operating systems.

The Microcomputer Software Association, a section of the Association of Data Processing Service Organizations, has elected its officers for 1983. They are: president, Donald Devine, group vice-president, Comshare, Inc.; vice-president, David Cole, chief executive officer, Ashton-Tate; and treasurer, Merrit Lutz, vice-president, software products group of Informatics General Corp.

Smoke Signal Broadcasting, Inc., Westlake Village, Calif., and Medco Electronics, Ltd., Karachi, Pakistan, have formed a joint venture company, Pakistan Computers, Ltd., to develop special customer-oriented software operating in the Urdu, Arabic and English languages. Medco Electronics will manufacture Smoke Signal's Chieftain computers and will market the hardware and software in Pakistan and the Middle East.

Victory Computer Systems, Inc. has received a license from Exelan to manufacture and incorporate Exelan's Ethernet-based front-end pro-

cessor technology into the Victory Spirit and Factor microcomputers.

Nippon Telegraph and Telephone Corp. has selected three U.S. firms to supply equipment for Japan's telecommunications market. Paradyne Corp. will provide 9600 byte/sec modems, Plantronics, Inc. has been asked to supply prototype lightweight headsets and AMP, Inc. was selected to supply CCP cable connectors for field testing.

Datum, Inc. has expanded on-site service for its DSC 50 streaming subsystem through a third-party maintenance agreement signed with DMC Systems, Inc. of Santa Clara, Calif.

Mead Data Central, a division of Mead Corp., has been granted an exclusive license by the New York Times Co. to distribute data bases now produced by the New York Times Information Service, Inc. Mead Data will offer The New York Times On-Line, a full-text retrieval service; The Information Bank, which abstracts material from The New York Times and 60 other publications; and Advertising & Marketing Intelligence, a data base created by The Times Co. in association with J. Walter Thompson, which provides abstracts from 60 periodicals.

Varian Associates and Digital Equipment Corp. have developed an automated laboratory information management system as a result of a joint agreement signed last year. The new system will be introduced at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy in Atlantic City, N.J., March 7-12.

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## Large IBM Micro Users Seen Wanting 3270 Emulation

(Continued from Page 64)  
through IBM marketing channels," Zilvitis explained. The packages are

acquired on an "as is" basis, meaning IBM does not alter them.

"If a customer wants the Visicorp companion series to Visicalc, those are not IBM-logged, but I have the ability to get them for a customer who wants to sign a volume purchase agreement," he commented.

### Typical User

According to Zilvitis, the typical IBM Personal Computer user in a large commercial account is a "business professional," a first- or second-line manager who utilizes one of four applications software packages: electronic spreadsheet, business graphics, word processing and data base management.

Such users frequently link their Personal Computers to host systems. "What we are seeing is a very large growth in demand for connectivity between the Personal Computer workstation and host data processing machines," he said.

The marketing manager said the typical high-volume customer hardware configuration consists of two diskette drives, 64K bytes of memory, a monochrome display and line printer. There is a considerable demand for 320K-byte diskette drives, and "We have a lot of customers putting the asynchronous communications adapter card in the machine," he noted.

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CompuTool is a growth-oriented company developing and cultivating a strong niche market. CompuTool interactive 3D CAD/CAM systems address manufacturing productivity needs through the applications of state-of-the-art technology. To enhance your ability to succeed, CompuTool has developed a strong team-oriented sales and marketing environment to capitalize on the opportunities of the CAD/CAM market.

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For prompt consideration, please forward your resume and salary history/requirements, in confidence to:

**HERMAN A. RUBIN  
DIRECTOR OF SALES  
COMPUTOOL CORPORATION  
5630 Lincoln Drive  
Minneapolis, MN 55436**

### THE PENNSYLVANIA STATE UNIVERSITY

Continuing faculty positions in computer science at a number of The Pennsylvania State University's branch (2-year) campuses beginning August 22, 1983. Candidates should be genuinely interested in teaching lower-division baccalaureate and service courses. COBOL-oriented courses add considerable spice to the teaching diets at several of these campuses at which an associate degree is offered. M.S. in computer science is required; completion (or near completion) of Ph.D. is highly desirable; demonstrated desire for continued scholarly growth weighted heavily. Please indicate specifically if interested in an assignment involving associate degree program. A letter of application with resume and names of three people who may be contacted as references should be sent to Dr. Fred L. Blevy, Computer Science Department, Box 202AA, Whitmore Lab, University Park, PA 16802. Deadline is March 31, 1983. AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.

## Opportunities In Computer Programming/Operations Saudi Arabia

The King Faisal Specialist Hospital and Research Centre is a modern multi-disciplinary specialty and referral health-care facility located in Riyadh, Saudi Arabia. We are currently seeking highly qualified professionals to operate the new CANCER THERAPY INSTITUTE, the most comprehensive and advanced institution in the Middle East incorporating extensive facilities for investigations in cancer treatment and research.

Current openings include:

### Data Analyst

Applies hardware and software resources of the CTI to solve complex scientific problems generated by the scientists and staff, and maintains/directs repairs of the hardware/software systems. An M.S. in Science or Engineering with 5 (+) years experience in the application of computer systems and languages for scientific problems and experience in advanced computational techniques such as Monte Carlo calculations, heuristic programming, linear programming and Fortran/RSX-11M languages is required. Starting annual salary: approximately \$61,000 (U.S.).

### Programmer/Analyst II

Designs and tests program logic, codes programs and prepares them for computer operation. A B.S. in Computer Science or related field with 5 (+) years practical experience in EDP programming work, experience with DEC PDP 11/70 and with Fortran/RSX-11M programming/job control languages is required. Starting annual salary: approximately \$41,000 (U.S.).

### Computer Operator I

Will operate computer, input data and monitor system performance during production runs. A high school education with at least two years technical data processing training with 3 (+) years experience as a Computer Operator (1 of which being in supervisory capacity over other operators) and familiarity with DEC PDP 11/70 hardware is required. Starting annual salary: approximately \$28,000 (U.S.). (This position is single status contract only.)

Benefits for an initial 2 year contract in addition to the potential U.S. tax-free compensation include: free transportation, 30-day annual paid vacation; free furnished housing; educational tuition for eligible dependents; bonus pay and leave; and more.

If you wish to be considered for a position with the support operations of this Treatment and Research team, we would like to hear from you! Please call toll free 800-251-2561 or indicate the position in which you are interested by sending your resume and salary history to: **Steven H. Ludlam, Personnel Consultant, HCA - International Division, P.O. Box 550, Nashville, TN 37202.** An Equal Opportunity Employer.

**HCA  
International Division**

## SYSTEMS PROGRAMMERS San Diego, California

Science Applications, Inc., a La Jolla-based R & D firm, has immediate openings for two DEC-10 systems programmers. Qualifications include 3 to 10 years experience with either the TOPS-10 or TOPS-20 operating system and familiarity with PDP-11 assembly language. Experience with network programming (DECnet and X.25) a plus.

These positions involve: maintaining and enhancing the TOPS-10 operating system; writing and maintaining device driver software; supporting utility software; and consulting with users of the DEC-10 Computer Center.

SAI, an employee-owned company, offers a excellent benefits package and competitive salaries. Please apply in person or submit resume, with salary history, to:

**SAI SCIENCE APPLICATIONS, INC.**  
1200 Prospect Street  
P.O. Box 1454-DR  
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(404) 231-3535

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(301) 625-0400

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(201) 845-7668

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Albany  
(518) 483-6844

80 Lakeland Blvd.  
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(716) 853-6203

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(513) 481-1373

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Prog/Anal (2 yrs COBOL, IBM 370) 20-25K  
Prog/Anal (RPG 111 or RPG 11) 20-40K  
Prog/Anal (2 yrs DEC PDP 11) 25-31K  
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Prog/Anal (2 yrs IMS or CICS) 25-35K  
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Outstanding challenges attract exceptional people — people with the discipline and imagination to solve tough technical problems. That's the kind of people we have at GE, and that's why we were given the challenge to help NASA develop a unique large-scale computer project using the most sophisticated computer technology available in super computers, networking systems, graphics, systems, communications and software. This system will constitute a national resource to be utilized by the entire United States aeronautics research community.

Only a company like GE can offer the challenge of highly-advanced technological problems combined with the stability and resources of a world leader. If you want to work on this exciting project, and be a part of a scientific team with an unmatched reputation for excellence, look into the following career opportunities:

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Space Systems Division

### Data Systems Engineers

Several positions, including a lead position, are available. Requires a Bachelor's degree or equivalent experience, and several years of experience with distributed data processing, network control and high-speed data transfer.

### Lead Systems Test and Integration Engineer

Requires a Bachelor's degree or equivalent experience, and 5-7 years' experience in distributed data processing, network control and high-speed data transfer. Working knowledge of hardware/software architecture, local-remote networking, long-haul communications links, and/or color graphics displays desirable.

### Senior Test Engineers

Requires a Bachelor's degree or equivalent experience, plus 3-7 years' experience in systems test integration. Exposure to state-of-the-art computers and high-level languages is also required.

Positions are also available for Programmer Analysts with proven SIMSCRIPT II.5 experience.

We offer highly competitive salaries and a comprehensive benefits program. Apply by sending your resume to Professional Placement, General Electric Company, Western Systems, Dept. C21, 1277 Orleans Drive, Sunnyvale, CA 94086-1193. No phone calls please. We take pride in being an equal opportunity employer. U.S. citizenship required.

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# Bechtel

## Computer Professionals

### San Francisco East Bay Area

Bechtel, a world leader in engineering and construction, has openings on a state-of-the-art (IBM 3033 & 3083) financial system development project. All positions are based in suburban Walnut Creek, California, just minutes away from San Francisco.

#### Database Design Supervisor

Duties: Participate in database design efforts for shared databases used by multiple applications.

Requirements: 7 to 10 years' data processing experience, including 2 plus years' supervising, 5 plus years' in creation of both logical and physical database design (DL/I, prefer CICS environment). Experience with DB/DC/DD and structured analysis and design; familiarity with DB PROTOTYPE and SMQ II.

#### Database Analysts

Duties: Create an integrated logical database design and subsequent physical database design, prepare documentation, train team members in use of DB/DC/DD and Data Designer.

Requirements: 5 to 7 years' data processing experience, including logical and physical database design, DL/I (prefer CICS environment), DB/DC/DD, Data Designer, DB PROTOTYPE and SMQ II.

#### Data Dictionary Support Analyst

Duties: Coordinate data dictionary reporting to users, install and test software used in support of data dictionary and database design, develop data dictionary utility programs, and set up and control mechanisms for generation of programming definitions (COPYLIB and JCL).

Requirements: 5 to 7 years' data processing experience, including 2 plus years' DB/DC/DD, programming on IBM 3033 and 370, and Mark IV or other report writers.

#### Data Security Analysts

Duties: Administer and maintain logical security rules for a production environment which includes DL/I databases, OS and Mark IV datasets, and ACFII security package.

Requirements: 2 plus years' ACFII experience preferred, but will consider RACF. Demonstrated ability to translate user data security requirements into parameters used by internal control software required.

#### Software Configuration Analyst

Duties: Oversea Software Configuration environment and incorporate system efficiencies and enhancements.

Requirements: 4 plus years' IBM OS/VS or MVS, OS JCL, TSO/SPF, linkage editor and utilities required. Ability to design, code, and test programs in COBOL and/or PLI. Familiarity with Panvalet preferred.

#### IBM Systems Programmer/Technical Support

Duties: Provide technical support to programmers and analysts in the use of IBM operating systems and utilities. Develop standards and procedures for application development and configuration management.

Requirements: 5 plus years' application development experience (including dump reading) with MVS operating system using TSO/SPF and Panvalet. System generation knowledge with CICS and IMS/DB is a plus.

In addition to career growth, Bechtel offers competitive salaries, a liberal relocation policy, and an excellent benefits package, including a dental plan, medical and life insurance, and tuition refund.

For consideration of any of the above positions, rush your resume and salary history to:

Pat Mabutas  
Bechtel  
Employment Dept. 46C-2  
P.O. Box 3965  
San Francisco, CA 94119



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### MVS SYSTEMS PROGRAMMERS

5 years experience in large scale IBM environment which includes IBM systems programming education.

Candidates must have in-depth experience with MVS/JES2 SP1.1 or 1.3 and preference will be given to applicants with current working knowledge of: ACF/NCP/VTAM R3, MSNF, TSO/SPF, VM/CMS, SAS, CICS, ADABAS, COMPLETE, OMEGAMON.

Applicants will be selected on the basis of product mix, level of expertise and proven ability to move to other products quickly.

Send resumes, including salary history to:  
Dennis Fleming

INTERNATIONAL INFORMATION SERVICES  
239 Glenville Road, Greenwich, CT 06830

### SYSTEMS PROGRAMMER

The National Academy of Sciences, a prestigious Washington D.C. non-profit institution, which has been addressing important national issues for over 100 years, has a career opportunity for an energetic individual to join its Office of Automation Services.

Position involves major responsibility for systems software in a rapidly evolving environment. Other responsibilities will include assisting in the evaluation of new options and setting shop standards. Applicants should have a strong background in systems software with at least 2 years' experience in IBM DOS/VSE, CICS, VTAM and ALC programming. Knowledge of data base concepts helpful. Environment also includes distributed processing with Wang, FOUR PHASE and micro-computer systems.

The National Academy of Sciences offers an excellent fringe benefit program, liberal annual and sick leave, paid holidays and retirement plan with immediate full vesting. Starting salary up to \$35K depending upon qualifications and experience.

Please send resume, including salary requirements, to: P.M. Parker, Personnel Office, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418 or call (202) 334-3401 for further information.

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#### Software Development Engineers

Requires a BS degree in computer science, electrical engineering or mathematics. Your duties will include design, test and integration of real-time operational software with emphasis on modular and structured programming techniques. Experience in assembly language and PASCAL and/or JOVIAL is desirable.

#### Systems Software Engineers

Requires a BS degree in computer science, electrical engineering or mathematics with experience in design and development of real-time programs in both assembly and higher order languages.

You will be responsible for the development of flight software for advanced guidance and control systems for aircraft. The software design will involve working with algorithms and subsequent integration with hardware.

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We are seeking Telecommunications Designers who have heavy experience with Telecom Systems and IBM network protocols (SNA, VTAM, etc.). Experience with linking IBM mainframes to other manufacturers' equipment is a plus. You will be responsible for designing, implementing and troubleshooting large networks. The ability to communicate with senior management as well as systems programmers is a vital requirement. Spanish useful. One of the positions is located in the Caribbean Basin and travel will be required.

You will be compensated with salaries and benefits that reflect the importance of this position such as local living expenses, medical insurance, a vehicle and single or married status. For immediate consideration please forward your resume to: P-E Computer Services Inc., Ashford Bank Building, 1035 Dairy Ashford, Suite 300, Houston, Texas 77079 or call (713) 556-9513. We are an equal opportunity employer.

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**PROGRAMMER/  
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The Department of University Computer Systems is seeking a highly qualified individual with state-of-the-art experience in designing, developing and maintaining on-line systems using IBM's CICS software; design computer forms, set up computer job runbooks, and computer operations procedures, review all system changes and additions pertaining to new systems and/or proprietary software; establish computer schedules for offices; design and coordinate user system control functions with user departments and data processing operations; provide technical support to user departments and Computer Systems staff.

**MINIMUM QUALIFICATIONS:** Bachelor's Degree in related field or equivalent experience. Three (3) years of programming and systems development experience with on-line systems. Additional background desired: working knowledge of COBOL or PL/I, OS, JCL, CICS, VM/CMS helpful. **SALARY RANGE:** \$22,000 to negotiable. Send resume to:

MR. MALCOLM L. TOEDT,  
DIRECTOR

UNIVERSITY OF  
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Computer Systems  
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Challenging opportunity for senior level person to participate in analysis, design, development and installation of microprocessor based applications. Incumbent will also be responsible for structured analysis and design of Hospital Information Systems.

Qualifications include: extensive experience with health care applications development; COBOL, Data Communications, Data Base Management Systems; and structured methodologies. Project Management and/or microprocessor experience desirable.

Mercy Hospital offers a competitive wage program plus an excellent fringe benefit package. Interested applicants should submit application or resume to: Jane Hawks, Personnel Office.

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TANDEM systems experience preferred. Requires working knowledge of:

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Requires B.S. in EE or Computer Science with 5 plus years related experience.

**Software Engineers.**

TANDEM systems experience preferred. Real-time, software design, development and testing:

- Application software
- Communications software
- Operating systems
- Data-base applications
- Diagnostic software

Requires TAL (a PASCAL type programming language) and MACRO-11 experience and 3 or more years in the field with a B.S. in EE, or Computer Science.

**Software Engineers.**

PERKIN-ELMER 3230 or VAX 11/750 computer systems experience preferred. Real-time, Software Design, Development and Maintenance:

- Application Software
- Communications Software
- Operating Systems
- Diagnostic Software
- Maintenance Applications

Includes both Assembly and FORTRAN Language Applications. B.S. in EE, Math or Computer Science with 3 or more years experience required. Will also consider recent graduate with a high grade point average and one of the above stated degrees.

**Software Test Engineers.**

2 to 4 years in software systems testing plus enough software development experience for:

- Definition of test requirements
- Generation of test plans/procedures
- Test execution and reporting

B.S. in Computer Science or Math required.

**Software Operating System Engineers.**

Emphasis on real-time distributed data acquisition/processing systems.

- PERKIN-ELMER 3230 NETWORKS
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  - PDL 81
- VAX 11/750 to VAX 11/730 NETWORKS
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  - PDL
  - CMS
  - SNA
  - FORTRAN
  - UNIX
  - FORTRAN

Should have a minimum of two or more years experience

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Emphasis on large-scale real-time distributed data systems:

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**MIS PROFESSIONALS****Senior Specialist.**

Must have ability to lead technical support function in a service oriented, controlled environment. Must be experienced in:

- MVS/JES2 generations and software installations
- VTAM/NCP and data base

Prefer 8 or more years technical experience.

**Senior Software Engineers.**

Must have ability to control network configurations to meet service level requirements. Requires experience in:

- VTAM/NCP, CICS and TSO in an MVS environment
- MVS/JES2 generation

Prefer 4 or more years technical experience.

**Senior Software Engineers**

Will control all phases of data storage administration in an MVS environment and experience in:

- Data base installation, definition, and maintenance (IDMS or ADABAS)
- Data security (RACF or ACF2)

Prefer 4 plus years technical experience

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A newly formed department offers several key openings for computer professionals to design and develop hardware and software systems, new applications and communication protocols. All positions listed below require an appropriate degree and directly related experience.

## Sr. Data Communications Engineer

Develop a five year plan for division network communications, design and supervise the installation of data communications networks. Requires experience with communication hardware and protocols; familiarity with ISO and ANSI standards, including X.25; and knowledge of SNA, DECNET and PRIME/NET systems/protocols including SDLC and DDCMP.

## Fourth Generation Language Specialist

Establish Information Center Training. Experience in application development using End User Software Tools such as IFPS, FOCUS, TELL-A-GRAF, and SAS is required.

## Sr. Programmer Analyst

Provide installation and maintenance of software for IBM (MVS), VAX (VMS), Honeywell (GECOS) and PRIME computer systems.

## Sr. Systems Analysts

Perform systems analysis of sophisticated MRP systems. A programming background is mandatory.

## Office Automation Specialist

Provide division leadership in the selection, acquisition, and installation of Office Automation equipment including Word Processing, Personal Computing, and Graphics Systems.

## Sr. Hardware/Software Engineer

Design and develop innovative microprocessor-based systems. A technical degree is required.

## Compiler Engineer

Specialist in high order language compilers and software user tools.

## Data Analyst

Perform analysis and implementation of Logical Data Base designs. Experience with data normalization techniques, data dictionary usage and end user view synthesis.

Ford Aerospace offers long-term project stability and a comprehensive benefit package — including relocation assistance.

For immediate consideration, please send your resume to: **Marsha Bridges, Professional Placement, Dept. A762-006, Ford Road, Newport Beach, CA 92660.**

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**Larry Mulligan, Director Liability Systems (518) 447-5845**

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## PROGRAMMERS UNIX/C APPLICATIONS

These positions involve the design and implementation of medical information systems. Requires 2 years programming with experience in UNIX and C. Requires drive and initiative, the ability to work well on a team and the capability of developing software within deadlines.

Qualified applicants should respond with resume including salary history to:  
**HEALTH SYSTEMS INTERNATIONAL**  
Personnel Department  
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## PROGRAMMER/ANALYST

Ground-floor opportunity with our software development and consulting company. Must have 2+ years experience in S/34, RPG II environment and be able to demonstrate strong programming and analysis skills. Should have worked on a variety of commercial applications and have experience in development of complex, on-line systems. Abilities with other languages or systems such as S/36, Series/1, micros a real plus. Must be effective in both verbal and written communication and be able to work well with people. Send resume to:

**CONWAY COMPUTER CONSULTANTS, INC.**  
P.O. Box 12801  
Jackson, MS 39211

Data Processing

## Regional Marketing Managers

The Commercial Division of Computer Sciences Corporation is actively seeking dynamic and incisive marketing professionals in the Health Care Industry. In this position you will be responsible for all marketing aspects of the INFOCARE product line including patient billing and account receivable systems, order communications, financials, pharmacy systems, and more. Additional responsibilities will include the establishment and development of a sales and marketing organization within the specific region.

The ideal candidates should possess at least 10 years of successful professional data processing sales experience with the majority of that time involved in the Health Care Industry. A proven track record of performance is mandatory.

Positions for INFOCARE Regional Managers currently exist in the following cities:

- Atlanta
- Chicago
- Houston
- New York

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**CSC**

COMMERCIAL DIVISION

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## Senior Software Programmer

Due to expansion and growth, The Stroh Brewery Company, headquartered in Detroit, has an immediate opening for a Software Programmer.

You will participate in a migration from an IBM 168 MVS 3.8 system to an IBM 3033 MVS/SP system. Qualified individuals will assume primary responsibility for maintaining and upgrading MVS, JES2, TSO, IMS experience would be a definite plus.

We support a network of 17 remote RJE sites and 80 local and remote timesharing and IMS users.

We offer an excellent starting salary with an attractive comprehensive benefits package. Please submit resume and salary history in confidence to: **THE STROH BREWERY COMPANY, Stroh Employment Center - CW/SP, One Stroh Drive, Detroit, MI 48226**

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## USA TODAY ANALYSTS/PROGRAMMERS PROJECT LEADERS FIELD SUPPORT

USA TODAY, the nation's newspaper, has career opportunities for computer professionals interested in the start-up of a large IBM 4300 mainframe operation and a nationwide distributed DATAPoint network.

**IBM 4300 SYSTEMS**  
Candidates must have solid experience on IBM mainframe and a proven track record in developing interactive MIS applications. Experience with VM, CMS, COBOL, and RAMP is strongly preferred. Experience in managing project groups a strong plus.

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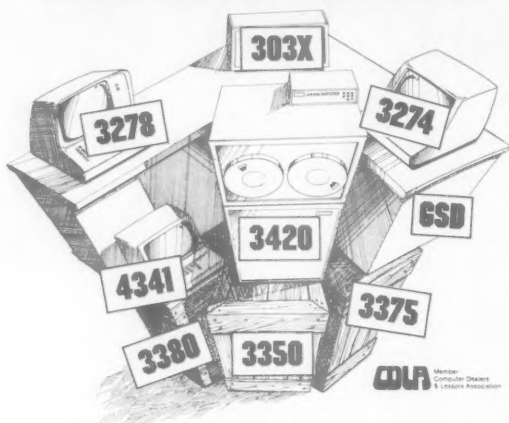
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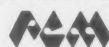
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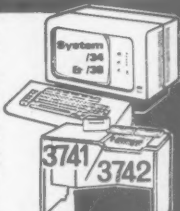
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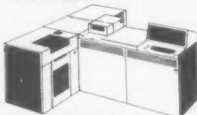
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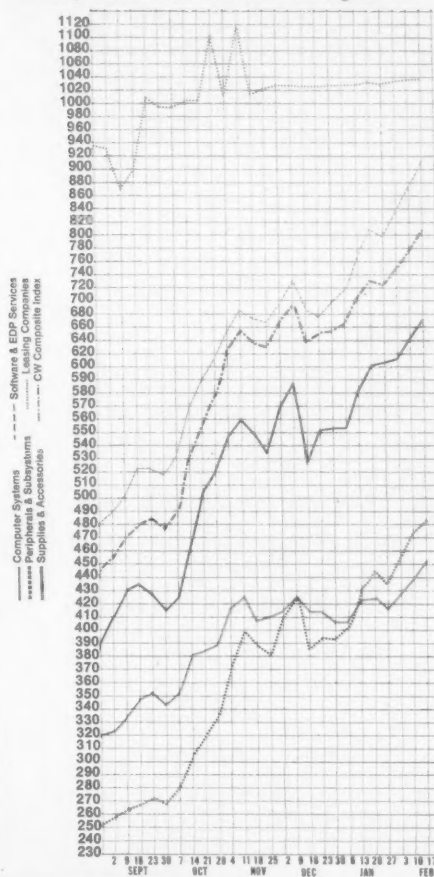
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CLOSING PRICES WEDNESDAY, FEBRUARY 16, 1983

All statistics compiled, computed and formatted by TRADE QUOTES INC. Cambridge, Mass. 02139

EXCH	SYMBOL	PRICE					WEEK	CHNGE
		1982-83	CLOSE	RANGE	FEB 16	NET		
COMPUTER SYSTEMS								
		(1)	1983	CHNGE				
A	ANDAL CORP	17-44	40 5/8	+ 1/2	+1.2			
N	BURROUGHS CORP	28-49	48 1/2	+ 1/2	+5.4			
N	CONTROL DATA CORP	7-17	16	+ 1/2	+3.2			
N	CRAY RESEARCH INC	21-48	47 1/2	+ 3/4	+7.3			
N	DATA GENERAL CORP	20-48	46 3/4	- 5/8	-1.3			
N	DATAPoint CORP	20-38	53 7/8	+ 3/4	+9.8			
N	DIGITAL EQUIPMENT	11-54	23 1/2	+ 1/4	+8.0			
N	DEC INC	62-129	123 3/4	+7	+5.9			
N	ELECTRONIC ASSOC.	8-12	11 3/8	+ 1/2	+4.3			
N	FLOPPING POINT SYST	5-12	10	- 1/8	-1.2			
N	FOXBORO	18-35	34 3/4	+ 1/8	+5.7			
N	FULCRUM CORP GRP	20-48	47 3/4	+ 1/2	+10.4			
N	GENERAL AUTOMATION	1-3	3	1/4	0	0.0		
N	HARRIS CORP	30-8	8 7/8	- 1/2	-6.7			
N	HEWLETT-PACKARD CO	38-87	83 3/4	+2 3/8	+2.9			
N	MONTEWELL INC	60-104	84 1/4	+5 5/8	+8.3			
N	IBM	48-100	98 3/8	+3 7/8	+4.1			
N	IPL SYSTEMS INC	5-10	8 1/2	- 3/4	-8.1			
N	MAGNUSON CORP SYST	2-16	3	+ 5/8	+26.3			
N	MANAGEMENT ASSIST	7-18	18 7/8	+ 1/8	+12.5			
N	MINI-COMPUTER SYST	1-4	1/2	0	0.0			
N	MODULAR-COMPUTER SYS	6-15	14 1/4	+ 3/8	+2.7			
N	NOHANK DATA SCI	10-19	17	- 3/8	-2.1			
N	NCR	38-104	102	+6 7/8	+7.2			
N	PERKIN-ELMER	17-33	30	-1 3/8	-4.3			
N	PRIME COMPUTER INC	16-45	44 1/4	+2 7/8	+10.9			
N	SPERRY CORP	21-38	38 1/2	+1	+2.6			
N	TANDEN COMPUTERS INC	14-34	28 3/4	+2 5/8	+10.0			
N	TEXAS INSTRUMENTS	71-178	168 3/8	+6 3/8	+3.9			
A	WANG LABS "B"	13-36	36 3/8	+3 7/8	+11.0			
A	WANG LABS "C"	11-36	36 1/4	+1 1/8	+5.4			
LEASING COMPANIES								
G	BOOTH FINANCIAL CP	22-30	26 3/4	+ 1/4	+0.8			
N	COMSEC INC	13-48	48 1/4	+4	+9.0			
N	COMMERCE GROUP CORP	1-1	1/4	0	0.0			
N	COMPUTER INVEST GRP	1-2	3/8	0	0.0			
N	CONTINENTAL INFO SYS	5-20	20	+2 1/4	+12.6			
N	DFF INC	5-13	11 1/2	- 1/2	-4.1			
N	ITEL	1-5	3/4	0	0.0			
N	LEAPAC CORP	1-2	1/8	0	0.0			
N	U.S. LEASING	18-41	40 1/8	0	0.0			
SUPPLIES & ACCESSORIES								
N	AMERICAN BUS PRODS	11-21	20 1/2	+ 1/8	+0.6			
N	ASTROLINE BUS FORMS	1-2	1 1/4	0	0.0			
N	BARRY MIGHT	13-24	23 3/4	+2 1/2	+11.7			
N	DYNATECH INC	1-1	1	+ 1/2	+0.7			
N	DUPLEX PRODUCTS INC	12-20	18 3/4	+ 1/2	+2.7			
N	ENNIS BUS. FORMS	10-30	27	+ 1/2	+1.8			
N	INCOMPANY	40-80	77	+ 3/4	+0.9			
N	MOORE CORP LTD	28-48	45 1/2	+1	+5.2			
N	NASHUA CORP	9-18	10 1/8	+ 1/8	+1.2			
N	STANDARD REGISTER	32-73	73	+7	+10.2			
N	TAB PRODUCTS CO	12-38	38 7/8	- 1/2	-3.5			
N	WALLACE BUS FORMS	22-33	33 3/8	+2 1/8	+4.1			
SOFTWARE & ERP SERVICES								
G	ADVANCED COMP TECH	1-8	4	+ 1/2	+14.2			
G	ADVANCED SYSTEMS INC	9-23	23 1/4	+ 1/4	+8.1			
G	AGS COMPUTERS INC	7-21	18 1/2	- 3/4	-3.7			
G	AMB COMPUTER INC	11-22	20 3/4	+ 1/2	+2.2			
G	ANALYSTS INT'L CORP	5-9	9	3/4	1/4	-0.7		
G	APPLIED DATA RES	16-44	42 1/2	- 1/4	-2.8			
G	ARCO COMPUTER SYST	11-22	22 1/2	- 1/4	-2.0			
G	ASTRADYNE CORP IND	1-5	3 3/4	- 5/8	-14.2			
G	AUTOMATIC DATA PROD	21-38	38	+2 3/8	+7.0			
G	CAI COMPUTER ASSOC	9-14	12 1/2	- 1/4	-2.0			
G	COMPUTER ASSOC INTL	12-45	45	+ 3/4	+1.6			
G	COMPUTERS HOWARD	1-12	5/8	- 1/2	-1.2			
G	COMPUTER NETWORK	4-9	9 3/8	+ 3/8	+17.1			
N	COMPUTER SYSTEMS	11-23	21 1/2	+ 1/2	+2.3			
N	COMPUTER TABS GRP	8-17	17	+ 1/2	+2.2			
N	COMPUTER USAGE	2-16	15 1/4	+ 3/4	+22.0			
N	COMPUTERIZATION SYST	13-38	37 1/4	0	0.0			
N	CONSERV CORP	11-27	27 3/4	+ 3/4	+1.4			
N	CORDWARE	6-12	11 1/2	+2 1/2	+27.7			
N	CULLINANE SOFTWARE	12-35	32 3/4	+1	+3.1			
N	CYCARD SYSTEMS INC	9-18	15 7/8	+ 3/8	+2.4			
N	DATA EXPANSION INC	3-4	3	0	0.0			
N	DATABAT	4-4	7/8	0	0.0			
N	DIATRION CORP	0-4	3 1/2	+ 1/2	+11.9			
N	ELECTRONIC DATA SYST	10-55	54 5/8	+4 1/8	+12.0			
N	INFORMATICS INC	10-28	27 1/2	+2 3/4	+11.2			
N	INSTE CORP	1-1	1/4	- 1/4	-0.9			
N	IPS COMPUTER MARKET	1-2	1 1/8	0	0.0			
N	KEANE ASSOCIATES	4-8	7 3/4	+ 3/4	+10.7			
N	LOGICAL	12-17	17 1/2	+ 1/2	+1.8			
N	MMOT SCI AMER INC	8-28	25 1/2	+1 1/4	+5.1			
N	MATHEMATICA INC	12-20	18	+1	+5.8			
N	MODULAR-COMPUTER GRP	6-19	19 1/2	+1 1/2	+12.0			
N	NATIONAL DATA CORP	13-22	21 3/4	+1 1/8	+5.4			
N	PARADYNE CORP	8-24	24 1/4	+1 1/2	+6.5			
N	PLANNING RESEARCH	8-15	14 3/4	+1 1/4	+4.2			
N	PROGRAMMING & SYS	1-1	4	3/8	0	0.0		
N	REYNOLDS & REYNOLD	17-29	29	+ 1/2	+2.9			
N	SEI CORP	21-50	49 1/2	+ 1/4	+0.5			
N	SHARED MEDICAL SYST	13-28	28 1/4	+ 3/4	+6.3			
N	SCIENTIFIC COMPUTERS	6-13	11 3/4	- 1/2	-4.0			
N	SOFTWARE AG	17-17	17 1/8	0	0.0			
N	SYNTHASAR INC	12-30	30 1/4	+ 7/8	+8.2			
N	UTS CORP	5-10	10 1/8	+ 1/2	+4.7			
N	WTLV CORP	7-13	10 1/8	+ 1/2	+5.1			
PERIPHERALS & SUBSYSTEMS								
N	AN INTERNATIONAL	1-15	3 1/2	0	0.0			
A	ANDERSON JACOBSON	9-26	21	- 1/2	-2.3			
N	AUTO-TRON TECHNOLOGY	8-21	18	-1 1/8	-5.5			
N	BANCTIC INC	7-35	17 3/4	+1 1/4	+6.8			
N	BEEHIVE INT'L	4-10	9 3/4	+1 1/2	+5.4			
N	BENTLEY & NEW	9-40	38 3/8	+ 3/8	+0.9			
N	CANEX CORP	2-4	5 1/4	+ 1/4	+12.5			
N	CENTRONICS DATA CORP	6-16	17	+ 5/8	+3.8			
N	CETEC CORP	4-8	7 1/2	+ 1/8	+1.8			
N	COMITRONICS	2-12	9 1/2	+ 1/8	+1.2			
N	COMPUTER COMMUN.	1-2	3/4	0	0.0			

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